COAL AGE

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DEVOTED TO THE OPERATING, TECHNICAL AND BUSINESS PROBLEMS OF THE COAL-MINING INDUSTRY

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Not a Job for George

"IT WOULD immensely encourage American industry in general," said the New York *Times* in an editorial review of the stabilization program for the bituminous coal industry suggested in the September issue of *Coal Age*, "if, in a period of widespread business depression, the bituminous operators should take steps to put their house in order, asking the cooperation of the government where it is needed."

THIS SENTIMENT, re-echoed in spirit in editorial opinion expressed in many other metropolitan newspapers, is a challenge to dormant leadership which raises a fundamental question. That question, frankly, is: Has the bituminous industry the resources and the leadership within its ranks to effect its own rehabilitation?

THE GENERAL PUBLIC is not alone in raising this question. In the stream of comment from coal-company executives and closely allied interests which has been flowing into the editorial offices of *Coal Age* since this stabilization program was first laid before the industry, this question is posed again and again in a pointed inquiry as to how the proposals set forth may and can be translated from the field of talk to the sphere of action.

SINCE the essence of the program suggested by *Coal Age* is self-help, it necessarily follows that action must start with the individual operator. There is no other way in which this, or any other program based upon self-determination and self-government which may engage the serious attention of the industry, can be initiated. Although effective action upon a large scale must come through group effort, this group effort will not be set in motion unless and until the individuals make it their personal business to line up the groups of which they are members for such action.

THERE is no magic in the stabilization program outlined. Neither is there any magic formula which will make that program, or any other that preserves independence to the industry, effective without hard work upon the part of the individual coal-company executives and local and national bituminous coal trade associations that believe in stabilization and that have more than sterile faith in the future of the industry.

IN REAFFIRMING its own conviction that "there is no substitute for individual responsibility and no hope of effective cooperation without it," *Coal Age* has no desire to avoid the responsibilities which it assumed in the publication of this program. The program was offered as a platform upon which there might be a union of leadership on major objectives. While the working out of the details of the principles therein set forth "can come only through discussion and counsel with and within the industry," the staff of *Coal Age* stands ready to assist in any and every way the industry itself may wish.

RECORD IN SIGHT

+ For Coal-Mine Safety

Scott Turner

THOUGH the present calendar year still has some months to run, it shows promise of being the safest year in coal mining. I stress this fact because, with a reasonable effort during the closing months of the year, the industry may be able to make a safety record of which it may be proud.

Two months ago we began to be aware of this opportunity to break previous low records. I commented on it publicly at the end of the first seven months. Another month, the eighth, is now past, and our luck still holds. With the goal in sight, everyone connected with the coal business, and, in fact, everyone in this country, should do what is possible to win this race against danger.

Look over these figures, and be convinced of the opportunity that lies before us: In comparison with the first eight months of 1930, the first eight of 1931 show a reduction of 27.4 per cent in coal-mine fatalities, yet the coal output diminished but 16.3 per cent; thus the reduction per unit of output was 11.1 per cent. Should the fatality rate for the first two-thirds of the year be maintained during the concluding months, the whole number of fatalities for the year will be less than 1,450, which beats every record since 1906—the earliest year of accurate statistics of coal-mine fatalities. During none of the last 25 years have fatalities been below 1,984; that was the death roll of the year 1922.

Stated in another way, the fatality rate for the first eight months of 1931 was 3.31 per million tons of production, as compared to 3.82 for the first eight months of the preceding year. Operators and miners should now use their best endeavors to keep even with or below that figure of 3.31 lives per million tons of coal; careful planning and earnest effort will be needed if the record is to be maintained.

Every one of the five main causes of accidents—falls of roof or coal, haulage, gas or dust explosions, explosives and electricity—has produced less fatalities; the rate from miscellaneous causes, including all others than the above five, also shows a decrease. In addition, every coal-mining state in the Union (except one) which had any fatalities in the first eight months of the calendar year of 1930, has had fewer fatalities in the first eight months of 1931.

No bituminous coal mine in the United States had a major explosion during February, March, April, May, June, July, August, or September, 1931, a period of eight months. For the eight months since Jan. 28, 1931, there has not been a major disaster in a bituminous coal mine. Not in 30 or more years has there been such a record, or one approaching it.

The reduction in the number of major disasters is especially gratifying, for in the past these have repeatedly shocked the entire nation. The U. S. Bureau of Mines has been active in advocating rock-dusting as one of the best ways to prevent widespread explosions; the result has justified the Bureau's persistent advocacy. Twice in the past few months, to say nothing of a dozen or more earlier proofs, rock-dusting has been shown effective in controlling mine disasters. Eighty or more men were in a mine which had an explosion, yet many—if not most—were saved by the interposition of rock dust. In another instance, the men in the mine were jeopardized by a local explosion, which remained local because rock dust stopped it before it gained headway. One man was killed, but about 150 lives in this mine were saved by rock dust.

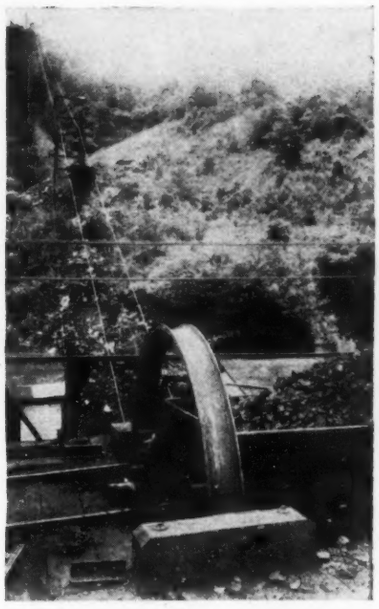
Increase in safety has not come easily. It is the result of the vigilant effort of operators, coal-mine workers, inspectors, and associations. The federal Bureau of Mines has helped in many ways. Last year we gave 110,000 employees in the mining industry complete courses of training in first aid, and a like number in the previous year; Bureau men have trained nearly 400,000 workers in the past five years. Over half the men in the industry have had the benefit of this training. Each year this agency of government had distributed a hundred types of pamphlets dealing with various phases of mine safety; more than 400,000 copies of these pamphlets are thus circulated annually. A popular accident-prevention course, beginning last autumn, has been given 1,500 coal-mine officials. Numerous other safety measures have supplemented these activities. Together they have spread safety data over the entire industrial field, and have aided coal-mining men materially in making the present year's record.

Each year, with the advent of cold weather, coal-mine operation takes a new lease of life; production increases; mines are reopened; more men are employed; and more hours are worked by the mine personnel. Too often this greater activity results in more accidents. This season is now at hand; care must be taken to adopt all feasible precautions to eliminate accidents. Our chance has come to show that we have finally succeeded in making coal mining safer than it has been for practically a generation. It is up to all of us to grasp this opportunity. The Bureau will announce the results at the end of each of the remaining four months. *Coal Age* and other agencies will help distribute the news; everyone should watch the score and no one should make any misplays for the balance of the season. It is a chance of a life time; I believe we will win.

Scott Turner

Director U. S. Bureau of Mines.

MODERNIZATION + Pushes Mead Mines To Front



Rotary Dump and Aerial Tram for Refuse Disposal

PRODUCTION in the Winding Gulf district of southern West Virginia has dropped less than that of the other smokeless districts. About ten Winding Gulf mines, representing that fringe with difficult conditions or obsolete equipment, have closed in the last few years, but this loss of tonnage has been balanced by the increased production of a few mines where modernized equipment has raised the capacity, reduced the cost, or improved the product. In this class are Mines Nos. 2 and 4 of the C. H. Mead Coal Co. An improvement program including a dry cleaning plant recently completed is already yielding the trident advantage.

Beginning with the latter part of 1929, the expenditure for new equipment has approximated $170,000 at Mine No. 4, $100,000 at No. 2, and $10,000 in a proposition of joint benefit to both. Mine No. 4 is equipped with a combination wet and dry plant which includes the feature of a storage bin that eases the difficulty of dry cleaning a run of wet coal coming out of the mine, and an "American" air table of higher capacity than any formerly installed by the American Coal Cleaning Corporation.

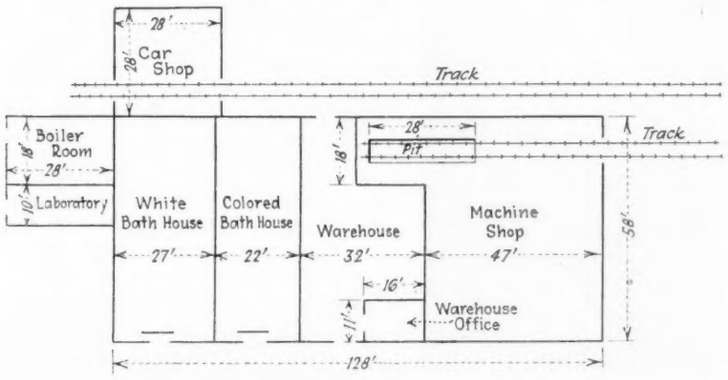
The mine-car equipment, consisting of a miscellaneous assortment of small cars, was replaced during 1930 and 1931 with a fleet of high-capacity steel cars at an expenditure of over $80,000. At Mine No. 2, a building was erected which houses under one roof a central machine shop, central warehouse, white and colored bath houses, car shop, and laboratory. In March of this year an aerial refuse tram costing about $20,000, was installed at No. 4 mine.

Topworks of the two mines are located about 2 miles apart in Raleigh County on Stone Coal branch, a joint line of the Chesapeake & Ohio and Virginian railroads, and shipments can be made over two additional lines, the Norfolk & Western and New York Central. No. 2 is near East Gulf and No. 4 is at Mead. The general location is 12 miles air line southwest of Beckley, W. Va.

Two seams, the Beckley and the Pocahontas No. 3, are worked at each mine and the coals are mixed. Openings in the former seam are approximately 375 ft. higher than the railroad, but the Pocahontas No. 3 is at railroad level at No. 4 mine and 20 ft. below railroad level at No. 2 mine. The property lines join, and at some future date the Pocahontas No. 3 workings will be cut together.

Mine No. 2, which was purchased by the Mead interests in 1920, has 2,250 acres of Pocahontas No. 3 and a smaller acreage of Beckley coal. Production of this mine has been increased steadily from 90,000 tons in 1920 to 578,000 tons in 1930. Mine No. 4, which was purchased from the Comago Smokeless Coal Co. in September, 1929, has 1,180 acres of Pocahontas No. 3 and a lesser acreage of the Beckley. Since its acquisition, this No. 4 mine has been raised from a production of 25,000 tons per month to 43,000 tons per month. At both operations the Pocahontas No. 3 seam is the producer upon which the improvements are based. Five to seven years will work out the Beckley coal. When acquired, No. 4 mine was already equipped with a modern steel tipple.

Layout of New Building at No. 2 Mine



Tipple, Dry Cleaning Plant, and Storage Bin at No. 4 Mine

New Cars, Empty and Loaded, at No. 4 Mine

During the summer of 1930, two Roberts & Schaefer hydroseparators were installed. One washes the egg (6x2¾ in.) and the other stove (2½x2½ in.). This year, the mine was equipped with a dry cleaning plant which is treating over 1,000 tons of ¾x0-in. slack per day.

Considering the capacity, this pneumatic separation plant occupies a very small building. Excluding the bag house of the dust-collection system, the building is approximately 20x26 ft. and four stories high. The blower, table, feed hopper, and dust-collecting fan are arranged one directly above the other in the order mentioned. The pipe connecting the table hood and suction fan is carried out through the side of the building and back in at a higher elevation as a detour around the feed hopper. Four hundred and six bags approximately 8 in. in diameter and 20 ft. long efficiently filter the coal dust from the air collected above the table.

As a part of the cleaning plant project, a 400-ton raw slack storage bin was erected near by. A belt conveyor carries the slack from the tipple to the bottom of a scraper conveyor which elevates to the top of the bin. At the loading point a 4-ft. section of the bottom of the scraper conveyor trough is a screen plate with 1¼-in. round holes. All of the slack which drops through these holes lands on a second belt conveyor which extends along under five feed gates with which the bottom of the bin is equipped. This belt conveyor discharges onto a third belt conveyor which elevates the material to a feeder bin above the pneumatic table.

Under normal operation part of the raw slack from the tipple goes up to the storage bin. That which drops through the holes and onto belt conveyor No. 2 is mixed with slack drawn from one or more gates in the bottom of the bin and goes directly to the table. If at times the raw slack coming from the tipple is wet enough to cause trouble if it were to go directly to the table, the situation is automatically taken care of by the fact that most of this wet material carries over the screen in the bottom of the drag conveyor and goes to the storage bin. This affords it some chance to dry and mixes it with dry slack.

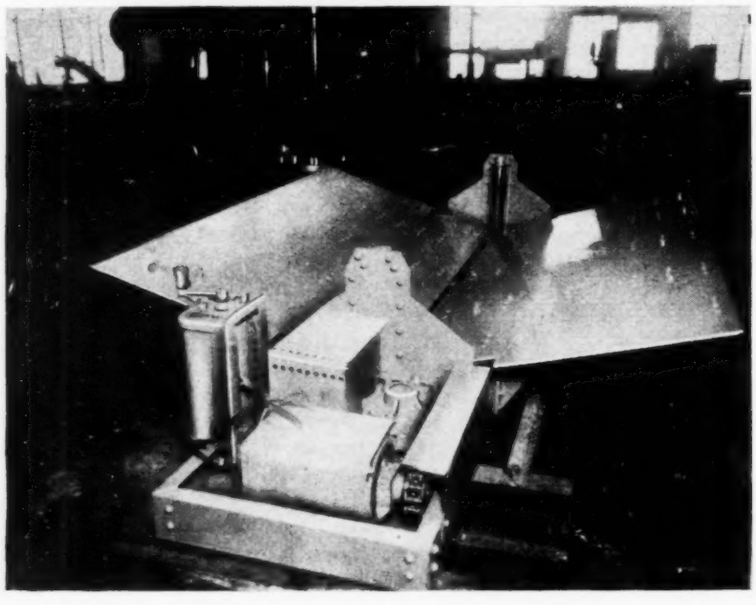
From a point near the table the operative can open or close any of the gates along the bottom of the storage bin. This is done through the medium of cranks and steel cables.

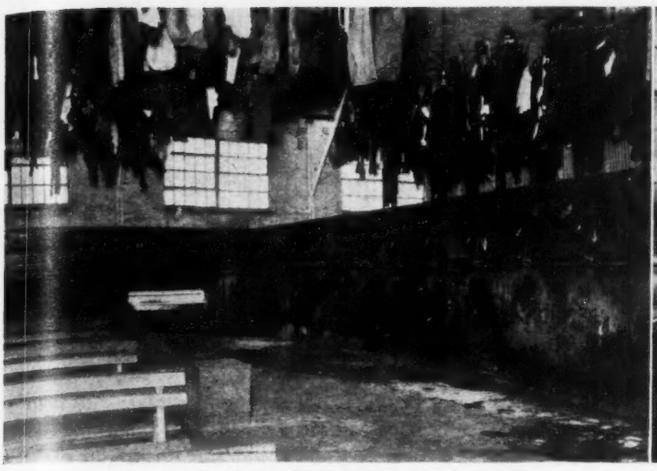
Normal rating of the table which is treating the ¾x0-in. slack, is 105 tons per hour. In order, as is the usual practice, not to operate the dry cleaning plant longer hours than the tipple the average feed is adjusted to approximately 110 tons per hour and the maximum when the coal is dry at 120 tons. The storage bin, of course, provides for longer operating hours of the air cleaner if increased production makes it necessary.

At the capacity that the table is being operated the percentage of ash in the ¾x0-in. slack is being reduced 1 per cent or more. Before the table was put into use the car analyses of the slack averaged slightly under 7 per cent. Shipments of the cleaned product average slightly under 6 per cent ash.

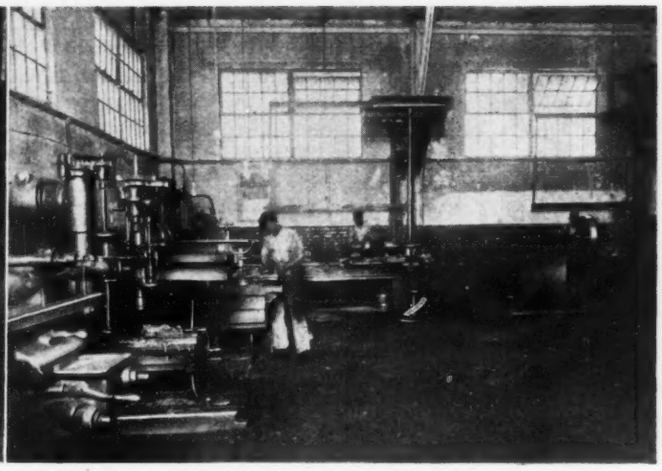
Uniformity of product is one of the great advantages of the cleaner. The sales manager can now send a sample shipment of slack with assurance that the ash content will be 6 per cent or under. Formerly he was never sure that a sample shipment

Shop View of Rock Car—Carrying Position





Shower Heads Along Open Trench in Bath House



The Shop Equipment Is Adequate for All Repair Work

would not analyze 8 to 9 per cent, due to a combination of circumstances in the mine. Inherent ash of the two coals being mined is thought not to exceed 4 per cent.

At normal capacity the refuse from the table should average 68 per cent ash. At the increased capacity now employed it is averaging about 53 per cent. The coal loss is slightly less than one-half of one per cent of the feed of raw slack and amounts to approximately 47 tons per day.

The Pocahontas No. 3 coal averages 39 to 41 in. in thickness and includes a characteristic 4 to 8-in. streak of bone, or high-ash coal, occurring 3 to 8 in. from the top. The Beckley coal averages about 4 ft. in thickness and has a thin slate parting under a 12-in. rider seam. All of the coal is hand loaded and so far as possible the bone of the Pocahontas No. 3 is discarded in the mine. Lumps with bone clinging to them are picked out at the tipple and put through a breaker. Refuse removed by the pneumatic table consists principally of cuttings from machines not kept clear of the bottom and of small pieces of the Beckley parting and the Pocahontas bone.

Westinghouse type CS 440-volt induction motors drive the conveyors and other equipment of the dry cleaning plant. Steel construction is used for all except the storage bin, and Armco galvanized iron is the covering. The No. 4 plant now has five loading tracks and three loading booms. There is a mixing conveyor in the tipple, but there is no provision for screening or mixing the air-cleaned slack. This and the dust from the bag house are loaded on a track directly under the table.

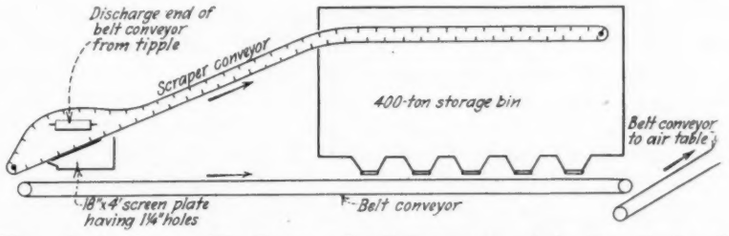
The loading station of the new aerial tram at No. 4 is located under a trestle erected at the end of a fill, about 800 ft. from the plant. It is at the mouth of a steep ravine which affords considerable dumping space. Cars of mine rock from the No. 3 seam, which is at railroad level, are hauled past the tipple and directly to the rotary dump on the trestle. Refuse from the preparation plant is dropped into mine cars from a storage bin and hauled to the same point. One man operating a trolley locomotive handles the hauling and dumping of cars.

Rated capacity of the tram when carrying to the intermediate distance is 35 tons per hour. It is a single bucket type and was furnished by the Interstate Equipment Corporation of New York City. The bucket capacity is 60 cu.ft. and the loading average is somewhat over 2 tons. The tram extends 1,400 ft. up the mountainside and has but one cross-over tower and this is close to the bottom. Track cables are $1\frac{1}{4}$ in. and the haulage cable is $\frac{5}{8}$ in.

A used hoist equipped with 100-hp. 440-volt slipring motor is employed to drive the tram. The drum was enlarged by adding wood lagging, to which were attached rope grips purchased from the Interstate company. The disposal has been averaging 115 buckets per day and the maximum has been 153 buckets.

Mine cars of the one size and type were purchased for both mines to replace a variety of smaller and inefficient cars. The new cars, made by the Sanford-Day Iron Works, of Knoxville, Tenn., are the all-steel solid-body type and are equipped with Sanford-Day roller bearings. They stand 23 in. above the rail and the inside dimensions are 81 in. by 10 ft. Two-hundred and sixty-five were purchased for Mine No. 4 and 180 for Mine No. 2.

In July a change was effected which is resulting in a reduction in the cost of purchased power for both mines. The coal company connected the two with a 2,300-volt line about 2 miles in length and now purchases through one meter instead of two. The increased diversity reduces the maximum 15-minute demand, and the total energy cost is decreased because the rate is a sliding scale equivalent to a quantity discount.



Through the Storage Bin Passes a Small Percentage of the Dry Slack and a Large Percentage of the Wet Slack

The power company transformer station is about midway on the connecting line. At each mine the coal company installed a complete main-line metering equipment. This provides for proper accounting to each mine, for a check on the efficiency of power utilization at each mine, and for checking the accuracy of the power company meters. Each metering outfit consists of a graphic voltmeter, graphic demand meter, and a watthour meter.

Recent improvements at No. 2

mine date from the latter part of 1929, when two hydroseparators were installed. Next a two-car rotary dump was installed in the tipple to handle loads hoisted up the short slope from the Pocahontas No. 3. The combination of a 947-ft. button conveyor and a 482-ft. belt conveyor from the Beckley seam was not changed. At No. 2, about 60 per cent of the production is from the Pocahontas No. 3 and the remainder from the Beckley.

Grouping the machine shop, warehouse, bath houses, car shop, heating plant, and laboratory under one roof, as has been done in the new building at No. 2 mine, is not the common arrangement but one which in this case proved highly economical in construction cost. The total floor area is 9,000 sq.ft., but the whole building including shelving in warehouse, boiler and heating equipment, but excluding machine shop and laboratory equipment, cost under $35,000.

The construction is brick and steel, and the frame and roof of the main part, which is 58x128 ft., was a foundry building before it was purchased by the coal company and moved to the mine. Set in the 9-in. brick walls, which are 18 ft. high to the eaves, are 26 steel sash, prism glass windows each with an area of 49 sq.ft. To simplify heating and hold down the temperature in the summer the building has been equipped with a ceiling of Sheetrock at eaves height.

White and colored sections are provided in the bath house and the capacities are 200 men and 100 men, respectively. In each division there are fifteen shower heads along an open trench. The concrete floor of the whole room slopes to the corner where the trench drains.

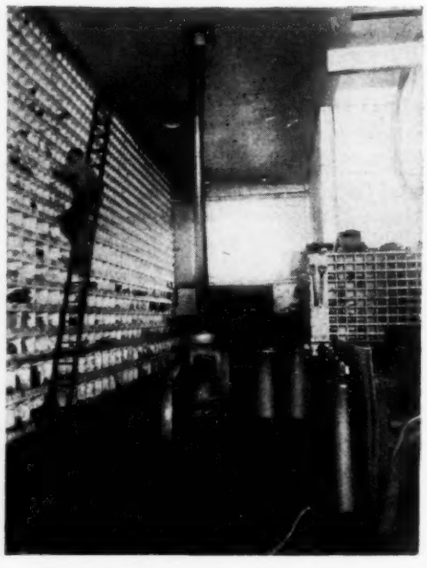
In the warehouse, which serves as a central distributing point for both mines, bins are constructed only around the walls. This simplifies the illumination problem, because all bins share in the direct and reflected general illumination of the room. On one side the bins are carried to the ceiling, which arrangement saves floor space but has the disadvantage that the clerk must do considerable climbing on the movable ladder. On the high side there are 1,408 bins and on the low side 695. The perpetual inventory record system is used.

The heating equipment consists of a 100-hp. locomotive type boiler and a 3,000-gal. hot-water tank. Steam at 15-lb. pressure supplies motor-driven unit heaters throughout the building and heats the bath water by condensing in copper coils inside the water tank. All condensate except a small quantity, from a steam dryer in the laboratory runs back into the boiler by gravity. It is necessary to add water to the boiler but once a week and then to raise the level but two inches as a maximum.

The new shop serves as a central machine shop for both mines. It is fitted to handle all mine equipment repairs. The equipment consists of a 25-ton wheel press; three lathes of the following sizes, 38 in. x 10 ft., 24 in. x 10 ft., and 18 in. x 4 ft.; one 24-in. back geared shaper; one 4-ft. radial drill; one No. 2 milling machine; one 2-in. Landis bolt machine; one general purpose grinder; one No. 1½ universal grinding machine; and one motor-generator welder.

C. H. Mead, president of the company, is a true progressive as regards mining methods and equipment. He does not believe in "going backward standing still." That is a sure process. He prefers to court success by keeping abreast with improved equipment and venturing forward with new ideas. At the present writing he has contracted for a trial of Cardox, has purchased an improved Joy Brothers coal saw, and is trying a self-dumping car made to his design for unloading mine rock in low coal.

No Bins Are in the Shadows



Purchase of the coal saw is based on previous experiments in sawing coal in the mine. It is the hope to use this saw for cutting above and below the bone in the Pocahontas No. 3 seam. By this method it may be possible to take out the bone without making the objectionable amount of slack that would result from making two cuts with an ordinary mining machine. The coal saw can make a 4-ft. undercut and the kerf is less than an inch thick.

Striking at a practice which appears fundamentally wrong—that is, hauling mine rock long distances to the outside when the mining itself is making storage space in the working area—a special rock car has been designed. Breaking rock small enough to load by hand into an ordinary mine car is expensive, and in low coal it is practically impossible to unload the car. The body of the special car consists of two flat plates making a surface 8½ ft. wide and 10 ft. long and hinged together at the center along a line which can be raised or lowered to facilitate loading or dumping the car.

Screws driven by a small motor mounted on the car raise and lower the hinged junction of the plates. Other supports for the plates consist of rollers along the side frames of the car. The car bottom can thus be made flat or sloping to the side and slabs of rock loaded which would otherwise have to be broken by hand tools or explosive. Unloading should be an easy matter, inasmuch as the center of the car can be raised so the rock will slide of its own accord.

The trail car was made by the Beckley Electric & Machine Works, of Beckley, W. Va. It stands 31 in. above the rail but could have been made 4 to 6 in. lower if necessary. Self-propelling mechanism can be added if found desirable. The car is 13½ ft. long over all and the capacity is approximately 2 tons.

From the standpoints of mine capacity and modern equipment the C. H. Mead Coal Co. now stands close to the top in the Winding Gulf field. Running on a partial time schedule the two mines shipped over 500,000 tons during the first half of 1931.

WESTERN KENTUCKY MINES + Effect Sharp Reduction In Power Costs

SUBSTANTIAL REDUCTION in power costs have been effected by the Bevier operations of the Rogers Bros. Coal Co. in western Kentucky as the result of the modernization of a mine generating plant which had been closed down for several years. The mine load was taken over completely by the modernized plant in March. In January, when the full load was on purchased power, the power bill was $1,532; in March, says J. L. Rogers, vice-president of the company, with an output approximately 4,000 tons greater than in January, power costs dropped to $502.

On the basis of a monthly saving of $1,000 in power costs, the company estimates that the total investment in power-house and generating equipment should be liquidated in less than three years and that the cost of engine and generator should be returned in two years. Operation of the mine at its normal output of 25,000 to 30,000 tons per month would mean still greater savings and proportionately shorten the time required to return the investment.

Suitable water is available for the operation of the plant and also, of course, fuel free of freight charges. On days when the mine is working, crushed picking-table refuse furnishes about 25 per cent of the power-plant fuel, but on idle days coal prepared for the market is alone available. In determining the monthly saving, the plant fuel is charged at market price, though a small credit really is due the plant for disposing of the refuse. The $502 figure also includes necessary labor and supplies. Moreover, the power plant outlet for pea and slack as fuel is equivalent to an increased market for these sizes, which usually are the most difficult to sell.

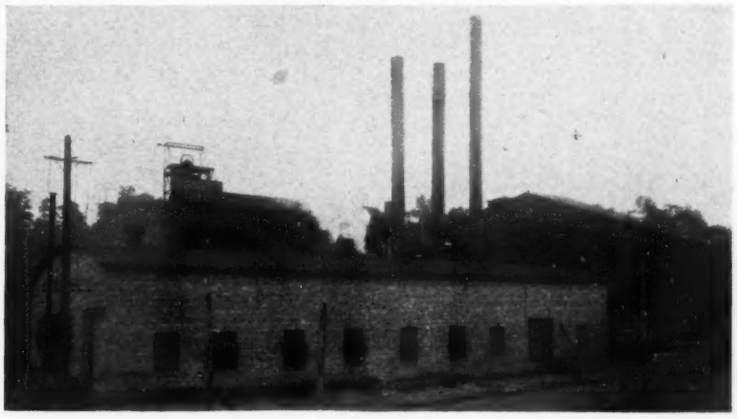
A feature which encouraged the owners to install the plant was the "guaranteed saving" clauses in the contract under which the engine and generator were purchased. The engine manufacturer is receiving the major portion of the total contract price in monthly payments, which are by contract made equal to the saving over purchased power. The coal company's own figures were accepted as the basis for computing the saving.

The operation thus provided with power consists of two mines which were consolidated in 1929. Bevier No. 1, a drift mine through which the output is now handled, was purchased in 1917, and the other, Cleaton No. 2, a shaft mine, was purchased in 1928. In 1921 the d.c. generating plant at Bevier No. 1 was shut down, two substations were installed, and purchased power was introduced. Upon termination of the five-year power contract the d.c. plant once again was put into operation. Cleaton No. 2 was operating on purchased power when acquired. This latter power contract expired in April, 1930.

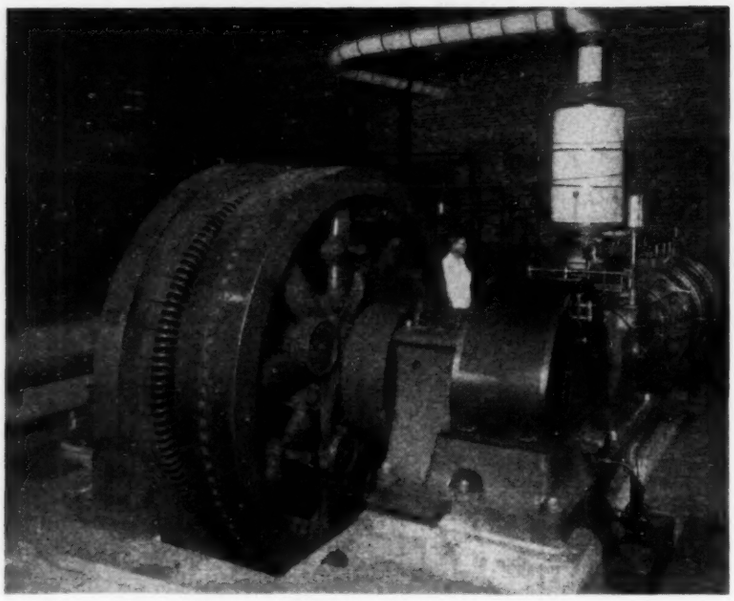
Rebuilding of the plant at Bevier No. 1 was completed in September, 1930, but the new engine was not put into regular use until late in February of this year. The delay was due to labor difficulties which closed the mine during the fall months of 1930, and a severe drought that prevented the accumulation of a supply of water till the closing weeks of February.

Three 150-hp. return-tubular boilers and two 250-volt d.c. generating units of the old plant were retained in their original positions. A new brick building, 50x90 ft., with steel truss and galvanized sheet roof was built over the old equipment. This provided ample space for the installation of the new engine.

The new unit consists of a 28x32-in. single-cylinder Skinner "Universal Unaflow" engine, of 632 i.hp., full load, direct-connected to a General Electric 400-kw., 2,300-volt



Power Plant Stands Close to Tipple, Fuel Being Delivered by Short Conveyor. Headframe in Center Background Belongs to Another Company



Power Station at Bevier Plant

a.c. generator with belted exciter. Briefly, the engine is further described as a 150-r.p.m. right-hand, heavy-duty, side-crank, automatic, horizontal unit, with bored guide. The diameter of the piston and tail rod is 6 in., and the over-all length of the unit is 28 ft. The shipping weight was approximately 87,500 lb. Cylinder lubrication is by the Madison-Kipp multiple-feed mechanical system, and other bearings are served by the Skinner system of automatic lubrication.

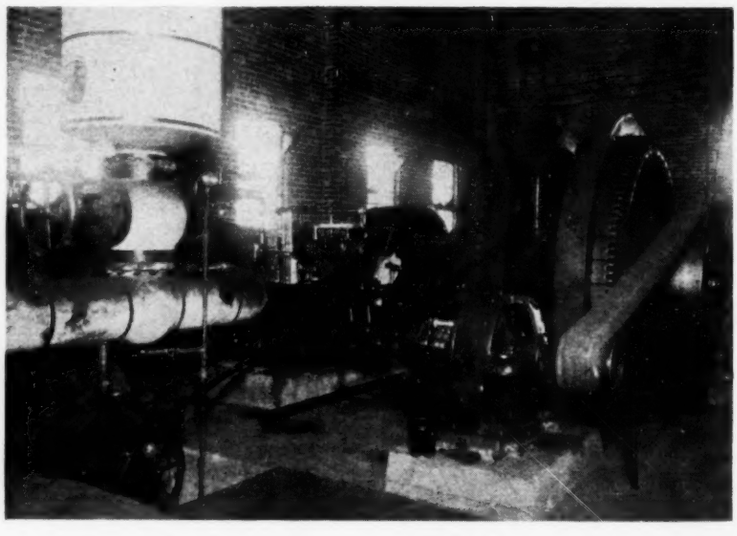
Operating non-condensing, as the engine does, the guarantee for the unit (assuming 120 lb. of dry steam and 0 deg. F. superheat at the throttle, and atmospheric exhaust) is that the steam consumption per kilowatt-hour will not exceed the following figures: At $\frac{1}{4}$ load, 42.1 lb.; at $\frac{1}{2}$ load, 34.7 lb.; at $\frac{3}{4}$ load, 33.0 lb.; at full load, 34.1 lb.; and at 5/4 load, 36.6 lb. These are based on generator efficiencies of 80.9, 87.8, 90.2, 91.4, and 92.1 per cent, respectively.

The net cost of the engine-generator unit was approximately $23,000, and the total cost of the power-house improvement, including the new building, approximately $34,000. A short conveyor delivers the fuel from the tipple to the boiler room. The boilers are hand-fired, but the plant labor totals only one man per shift.

When the new a.c. generating unit is in use, the substations formerly used with purchased power convert the current from alternating to direct. One substation containing a 150-kw. synchronous - motor - generator is located outside near the drift mouth about 1,000 ft. from the power plant, and the other, containing a 200-kw. unit of the same type, is located outside about $1\frac{1}{4}$ miles from the tipple.

Both substations have manual controls and at the distant station an operative has to be employed. In order to save the wages of this operative and eliminate substation conversion losses, one of the old d.c. generators is used on idle days in place of the new a.c. unit. On most of these so-called idle days, entries are being driven, work is being done on the haulage roads, and water is being pumped from the mine, all of which uses require d.c. power.

A close estimate of just what the purchased power rate per kilowatt-hour, including demand charge, would be for months of full-time production is not available. The net costs of purchased power during the months of January and February, 1931, when part of the mine requirement was generated with the old d.c. plant and the rest purchased on the existing Cleaton No. 2 mine contract, were 3.8c. and 3.6c. per kilowatt-hour, respectively. For these months the purchased energy consumptions were 30,300 kw. and 32,100 kw., respectively, but the exclusive use of purchased power during months of full-time operation might bring the net cost down to 2.5c. per kilowatt-hour.



Engine Direct-Connected to 500-Kva. 2,300-Volt Generator With Belted Exciter

MECHANIZATION PRINCIPLES + Take Definite Form As Experience Grows

By K. E. CAINE

Mining Engineer
Joy Manufacturing Co.
Franklin, Pa.

THE future will open up no royal road to profit for the coal industry. With the existing large fraction of overproduction, the probability of any relief-yielding increase in sales price through growth of consumer demand is remote, particularly in face of accumulating competition from substitute fuels. Under these conditions, procrastination in the hope for that better day which, in alleviating the troubles of the industry at large, will relieve the individual operator, is futile.

Most immediate, fruitful, and lasting relief will come only from individual effort. Moreover, profit can be expected from only one, or both, of two procedures: Either to increase sales realization through improvement in preparation, or to lower production costs through mechanization of underground methods. To this last means only is this article confined.

Besides the benefits it offers to operators individually, mechanization promises gradually to diminish the margin of the over-capacity which has stood in the way of fair profit. In requiring greater investment in equipment, mechanization will close down those properties which fail to realize its merit. A large number of the companies now operating by hand methods may find it impossible to refinance for mechanization projects.

Being the greatest component of the cost of production, the expenditure for labor in loading coal at the face is the point most vulnerable to the attack seeking cost reduction of underground methods. But that reduction must not be attempted at the expense of the individual worker. The best of industrial thought in the current depression stipulates that production costs should not be lowered by reducing wages. In labor-saving machinery for mine use is offered an alternative method whereby cost reduction is effected by raising the productivity per man shift.

Wage differentials between fields have added impetus to the growth of mechanization, especially loading-machine operations. That is why machines have been installed in large numbers in high-wage states, notably Indiana and Illinois, where machines alone have enabled the operators to regain lost markets.

K. E. Caine

Since his graduation in 1925 from the Carnegie Institute of Technology, where he studied mining, Mr. Caine has served as a mining engineer for the Joy Manufacturing Co. In this capacity he has visited mines in every coal-producing state of importance, examining plants, preparing estimates, and making recommendations on proposed installation of loading machines.

The board of directors represents the stockholders and decides the general operating policies of the company. In considering mechanization its members are primarily interested in protecting the owner's interests. Capital is invested in industry for the purpose of earning a return that is comparable to the risk. The board, therefore, so governs that the stockholders will receive a maximum yield on their investment. The directors, when considering mechanization, must base their decisions primarily upon monetary considerations, and their duty is first to keep their own company in a sound financial condition. Yet the effect of mechanization on the industry as a whole is important also.

The steady growth in mechanization—1930 showing an increase of about 35 per cent in the number of mines employing machines of various types for handling coal underground—proves that the expenditure for the required equipment has been justified. Following the fundamentals of sound investing, capital put into mechanical loading equipment is justified if the machinery will increase the net earnings to those from this same capital in any similar investment with a comparable risk.

If the investment required for a loading machine and allied equipment amounts to $15,000 and this unit produces an average of 250 tons per shift for the period of a year, during which the unit worked 250 shifts, it must increase the net earnings $0.024 per ton to yield 10 per cent and $0.048 to yield 20 per cent. By and large, labor-saving machinery is a safe investment outlet if the net return is 20 per cent. Results actually obtained from most mechanization projects have surpassed this return.

If it were only necessary to figure labor in arriving at cost reduction possibilities in machine loading, then the actual saving would be directly proportional to the labor rate. It the cost reduction in a high-wage district amounted to 20 per cent, then in a district where the wage rate is 10 per cent lower, the saving would still amount to 20 per cent, but the actual amount saved would be less, because the amortization rate for the same machine in either district, theoretically, should be the same. This brings out the fact that in the low-wage sections amortization is of increased importance in computing actual cost-reduction possibilities.

Net earnings rather than production costs should be considered in computing the yield from an investment in mechanization. For this reason the size and quality of the product are of transcending importance. That too, is why the primary step in the program should be a determination of the quality of coal needed to meet existing or expected markets. Then only can projections of methods be made to gain or retain those markets.

Having determined the market requirements, and gained full knowledge of the seam characteristics as to impurities, etc., the proper choice of preparation equipment can be made. It may be that the seam impurities are of such a nature that they can be removed underground; it may be that the seam contains irregular impurities which can be removed only in a surface preparation plant. It cannot be too strongly emphasized that the preparation facilities, picking tables with ample capacity, or suitable mechanical cleaning equipment are generally a prerequisite to the success of underground mechanization. The extent of the preparation necessary naturally governs the expenditure that must be made. The cost per ton is affected to that degree, which costs must be borne by the loading equipment.

The great differential between the price of lump coal and fine sizes makes it imperative that lump percentage be as high with mechanical loading as it was with hand loading. Any decrease in sales realization must be offset by a decrease in production cost resulting from mechanization.

A good policy is to experiment as far as possible with the methods proposed before making a large capital expenditure for equipment. This applies especially to face preparation methods. Knowledge of methods employed at other operations will aid the development of a system for an individual mine. Improvements or modifications of those methods may be made and a great deal of experimentation avoided. It cannot be said that all mobile loaders are adaptable to all systems of mining. For this reason the machine itself should be analyzed with relation to the job it is expected to do.

Safety records of mechanized mines show that accident hazards are materially reduced by machine operation. If the cost of production were the same for mechanical and hand loading the installation of machines would be justified if the safety of the worker were increased by so doing.

Time study data can be utilized to great advantage in analyzing the effects of face preparation, haulage, and other phases on the loading equipment. If the operating cost per machine minute is known, it is a relatively simple matter to prove or disprove the merit of proposed changes. From the time studies should come definite working programs.

Most of the loading machines operating successfully in the United States at the present time are in mines that were originally opened for hand loading. This situation has brought about the development of machines and operating methods that are adaptable to general systems of mining already in use. Knowledge gained from practical experience in individual operations already mechanized have in most instances made possible annual increases in tonnage output per machine shift, and corresponding decreases in operating costs. This is well illustrated at an operation in one of the Western states where the annual average production per machine shift has increased approximately 25 tons for each year since the initial installation in 1925, which consisted of 16 mobile loading machines.

It has been said that the success of any mechanized mining project depends 90 per cent on the organization and 10 per cent on the machine. The study of the individual and his relation to mechanization consequently is of real importance. Responsibility for results from equipment and man power rests directly with the operating personnel. As most mine operating men today have been schooled in methods of hand loading, the introduction of loading machines and allied equipment has brought about a radical change in their problems. The attitude taken toward mechanization is not the same for each individual. This variation is reflected by the amount of self-confidence and foresight displayed. Uniformity of progress could not be expected in so large a group.

Self-confidence in the ability to solve the new problems presented by mechanization is not only a commendable attribute of foreman or superintendent but is an absolute necessity. The foreman who can look into the future will see the necessity for mechanization and, as a result, will do his utmost to make it a success.

Few underground officials have had the opportunity of actually seeing the rapid growth of mechanization and the general improvement in mechanical equipment. The majority have been wholly engrossed in getting results from the equipment available to them at the expense of increasing their knowledge in the channels of more productive methods. Isolation has retarded to some extent the dissemination of information in certain mining communities. In those places, the foremen are skeptical as to reports of progress that filter through to them.

(Turn to page 541)

Make No Mistake

The steady growth in mechanization—1930 showing an increase of about 35 per cent in the number of mines employing machines of various types for handling coal underground—proves that the expenditure for the required equipment has been justified.

Net earning rather than production costs should be the basing point in computing the yield from an investment in mechanization. That is why the primary step in the program should be a determination of the quality of coal needed to meet existing or expected markets.

It cannot be too strongly emphasized that the preparation facilities, picking tables with ample capacity, or suitable mechanical cleaning equipment are generally a prerequisite to the success of underground mechanization. The loading machine must bear its portion of that expense.

In the opinion of some, it will be difficult to maintain production from machines after the first glamor of operation is past. If the production does fall on this account, only management is responsible.

GRAVITY ADJUSTMENTS

+Closely Follow Feed Characteristics

At This Ohio Washery

By ALPHONSE F. BROSKY

Associate Editor, Coal Age

IN the eyes of the Wheeling & Lake Erie Coal Mining Co., mechanization plans which consider mechanical loading alone, without mechanical preparation also, are not complete. Expanding their opinion the officials say that neither step, of itself, will meet the dual demand of today for low-cost production and high-quality product. The company, which operates a group of mines in the No. 8 field of eastern Ohio, as a subsidiary of the Hanna Coal Co., has held steadfastly to these views from the beginning of its modernization program.

One phase of this program, that dealing with the steps being taken below ground, has already been described (*Coal Age,* Vol. 36, p. 171). It is the purpose of this article to present the other phase: namely, what this company has done in preparation. As with the previous editorial material, what is here written deals with the No. 9 mine, which is located at Fairpoint and which is the starting point of this company's modernization efforts.

After investigation of existing cleaning plants using various systems and after numerous tests, the Link-Belt Simon-Carves process was chosen, and in 1929 put into operation. The plant has an over-all capacity of 135 tons per hour and a washing rate of 100 tons per hour, with facilities for close sizing, mixing, and loading over three tracks. Plus 4-in. is prepared by hand methods. The undersize is first washed and then screened into three products. These can be loaded individually or mixed into any combination, with or without the plus 4-in. lump. In 1930 a dryer for small coal was added to the plant.

The mine operates in the Pittsburgh, or No. 8, seam which averages about 5 ft. in thickness. Approximately midway from roof to bottom are two ½-in. slaty binders which sandwich a 1½- to 2-in. bench of bony coal. The bottom is of such hardness that it does not add materially to the complexity of the washing problem, even with mechanical loading. But over the coal is a 1-ft. thickness of drawslate which must be taken down after the mining of every cut. Above the drawslate is from 3 to 16 ft. of roof coal and above that is 6 to 8 ft. of soft shale.

With these possibilities existing of vitiation of coal by refuse, and with mechanical loading, there was no alternative but mechanical preparation without decreasing the sales value of the mine product. Here was raised the question, Why add to capital account to decrease mining costs if, by so doing, marketing realization is lessened and no real gain in net profit is made? The only answer to this query was to erect a cleaning plant, not merely to maintain the standard established by hand-loading underground but to better it.

Mechanical loading as developed at this plant is a mass-production process in terms of machine output. Consequently, selective loading which would reject the bulk of impurities at the face was out of the question. Taking the coal as run of seam, load-

Close-up of Preparation Plant

Table I—Plant Equipment Specifications

(Plant design and erection by Link-Belt; fabrication and equipment also by this company with exceptions below)

1. Track scale; 10,000 lb. Dayton.
2. Car dump; Phillips crossover.
3. R.O.M. feed conveyor; apron type, 36 in. wide, 47 ft. centers, 17 ft. rise, 22 f.p.m.; variable speed drive.
4. Main shaker; 50 in. wide, 4 ft. at 4 in. diam., 2 ft. at 1½ in. diam.; belt drive.
5. Cross conveyor; double-strand, 16 in. x 8 in. flights, 100 f.p.m., 26 ft. centers; silent chain drive.
6. Picking table; apron conveyor type, 48 in. wide, 50 f.p.m.; equipped overhead with two Cooper-Hewitt mercury vapor lights for artificial lighting.
7. Fixed degradation screen; lip type, between table and boom.
8. Lump loading boom; apron hinged type; silent chain drive; Shepard hoist.
9. R.O.M. crusher; 30 in. x 30 in. Link-Belt single-roll; Texrope drive.
10. Unit dust collector; Christie, with Robinson centrifugal fan.
11. Refuse conveyor; flights 36 in. x 5½ in., 50 f.p.m., 158 ft. centers, rising 44 ft.; silent chain drive.
12. Bone crusher; Link-Belt 20x18-in. double-roll tooth type, reducing 8 to 1¼ in.; belt drive.
13. Mixing conveyor; double strand 16x8 in. flights, 100 f.p.m.; 63 ft. centers, rising 16 ft.
14. Wash box; Link-Belt Simon-Carves No. 5,035; 5 compartments.
15-16. Automatic sample gates; controlled by General Electric hydraulic operators and definite time relays, types MC 9 and MC 11.
17. Fixed dewatering sieve; brass wedge screen 2 ft. 6 in. x 3 ft., ⅛ in. openings.
18. Sizing shaker screens; silent chain driven, 140 r.p.m.; upper deck, 4 ft. wide, 12 ft. at 3½ in. diam.; middle deck, 4 ft. wide, 16 ft. at 1½ in. diam.; lower deck, 5 ft. wide, 15 ft. 4 in. at ¾ in. diam.
19. Dewatering sieve; 2 fixed wedge wire screens, each 3x6 ft. at ½ mm.
20. Dewatering shakers; 4 wedge wire screens, each 4x10 ft. at ½ mm.; 300 r.p.m., 1½ in. stroke; pitch, ¼ in. per ft.; flexible hickory hangers.
21. Bucket elevator, 10x8x12 in. bucket; 100 f.p.m., 40 t.p.h.
22. Nut loading boom; 30-in. apron type, 100 f.p.m.; Shepard hoist.
23. Deep-well pumps; 2 Pomona Pump Co., 40 g.p.m. each.
24. Slurry sieve; 2 fixed wedge wire screens, each 3 ft. x 6 ft. at ½ mm.
25. Circulating pump; American Well single-stage centrifugal, 2,500 g.p.m., 50 ft. head.
26. Conveyor to drying plant; Goodrich 18 in. belt, 123 ft. centers, 18 deg. slope, 300 f.p.m.; Alemite lubrication; Texrope drive.
27. Screw feeder; 14 in. diam., 10 in. long; variable speed, 20.3:1 reducer.
28. Direct-heat dryer; Ruggles, 75x8½ ft. diam.; inner shell 3½ ft. diam.; pitched 3½ ft.; 6 r.p.m.; 60 t.p.h.; driven by 150 hp. Westinghouse CCI motor, 2,200 volts a.c.
29. Elevating conveyor; 12x8 in. flights, of copper-bearing steel.
30. Intermediate dry-coal conveyor; 18 in. belt, 109 ft. centers, 13-deg. pitch, 300 f.p.m.; contributing manufacturers same as 26.
31. Unit pulverizer; Strong-Scott, 2,000 lb. per hr. capacity.
32. Furnace, 12 ft. x 9 ft. 4½ in. x 15 ft. high, with thermal release of approximately 15,000 B.t.u. per cu.ft. per hr.
33. Conveyor from drying plant to washery; 20 in. belt, 96½ ft. centers, 18 deg. pitch, 300 f.p.m.; contributing manufacturers same as 24.
34. Suction fan; American Sirocco; size No. 9; Texrope drive.
35. Cyclone dust collector; Christie.
36. Drying plant superstructure; Truscon framing, 24x122 ft. x 50 ft. high.

Chutes, gates, and plates exposed to corrosion; formed from Armco ingot iron or copper-bearing steel.

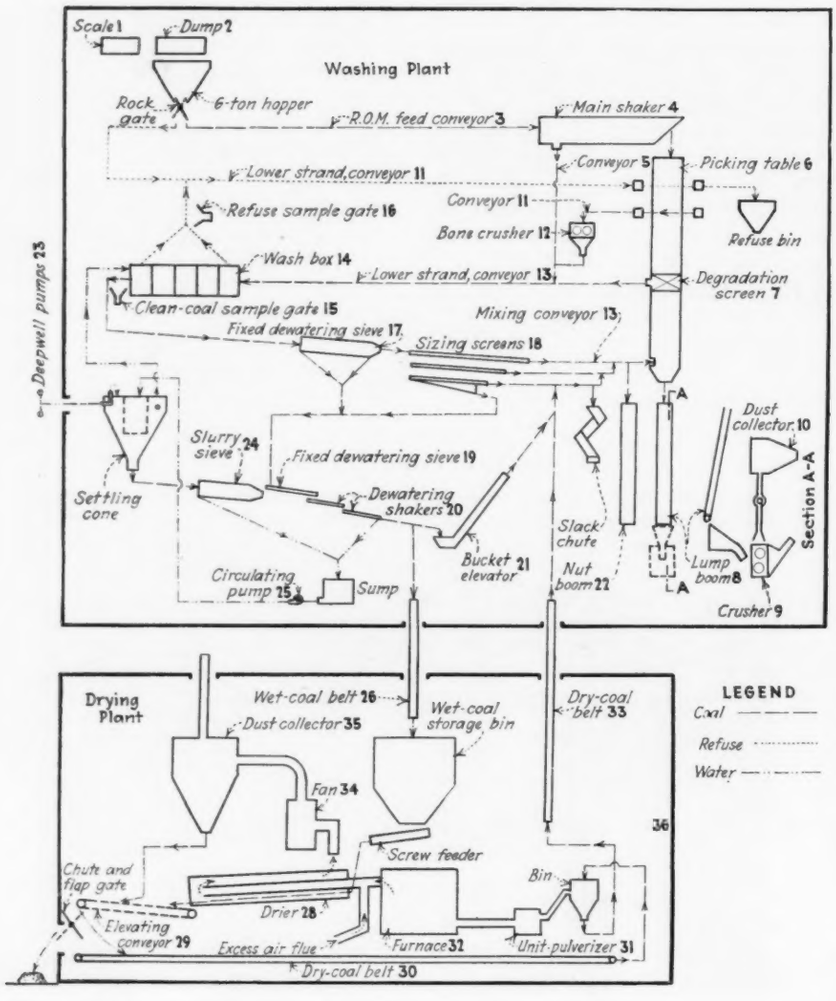
Unit heaters: Air-Way, with Burk Electric motors; vacuum system of radiation from Kewanee hand-fired boiler.

Motors and control equipment: General Electric.

Car retarders: Fairmont.

ing operations must necessarily pick up quantities of drawslate, as the roof cannot everywhere be held intact. Opportunities are provided for removal of the large pieces of slate, but the separation of the smaller particles of roof would be without purpose.

Fig. 1—Schematic Flow Sheet of Washery and Dryer



It should be explained that generally more impurity comes from the bearing-in bands than from the roof; also that the bony coal originating from this horizon in the seam constitutes the biggest problem in maintaining the correct gravity for separation.

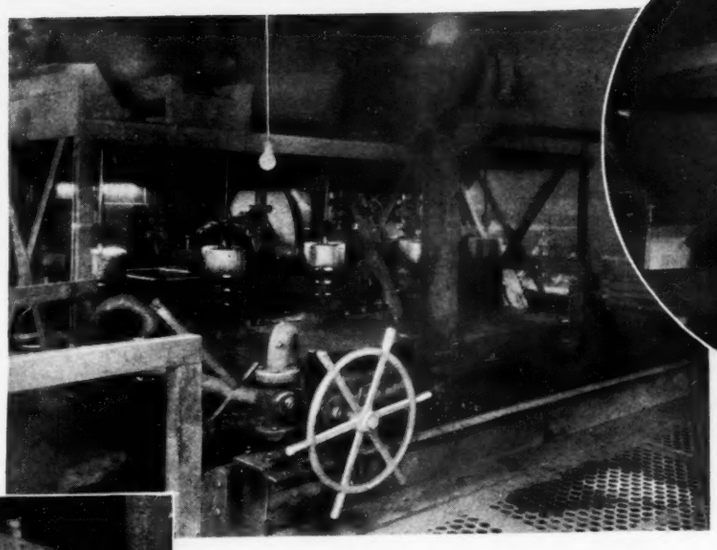
Dissenting from popular acceptance of gravity yields as a measure of successful results, partly because of the variability of the bone and slate content, this company takes the direct view of the consumer and considers final ash the end point. The gravity, therefore, is adjusted from time to time during the shift, to give the ash content wanted by the particular customer.

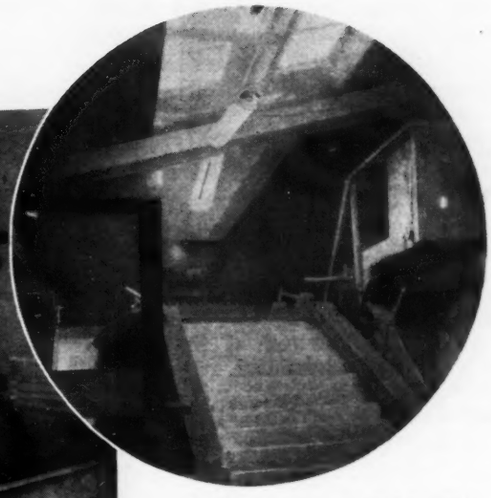
The low limit of final ash normally obtained is 6½ per cent; 7½ per cent is the maximum allowed by the management for 100 per cent mechanically cleaned coal. The product of the washery is marketed under the trade name of Mechano and Hanna No. 9 Stoker coal. It is sold primarily for domestic and industrial uses, and is finding a place in pulverized fuel.

There is no need to go into a minute description of the entire plant, as the flow sheet in Fig. 1 clearly indicates the process followed in screening, crushing, cleaning, dewatering, drying, mixing, and loading, from the raw coal to the finished products. Pertinent data on the major equipment incorporated in the plant are given in Table I.

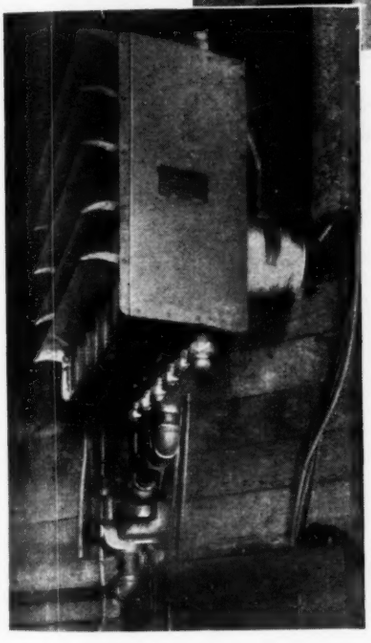
Roughly, 25 per cent of the raw feed is plus 4-in., and is removed on the main shaker screen for hand preparation on the picking table. Alone,

Five-Compartment Wash Box

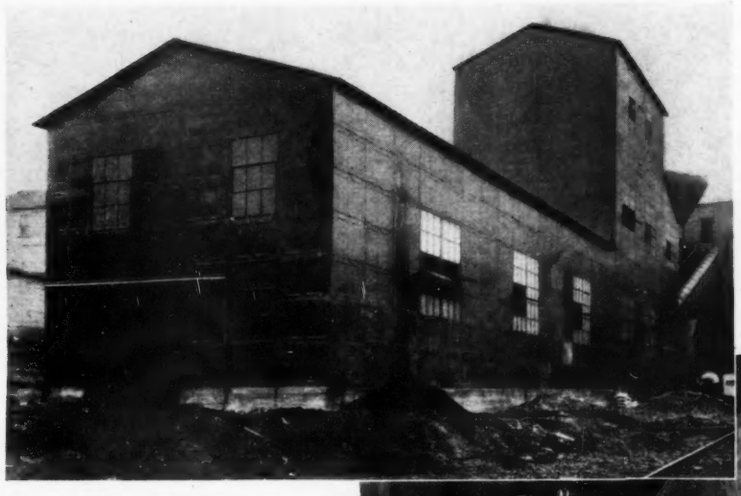




Dark Days Are Bright Days Under These Mercury Vapor Lamps

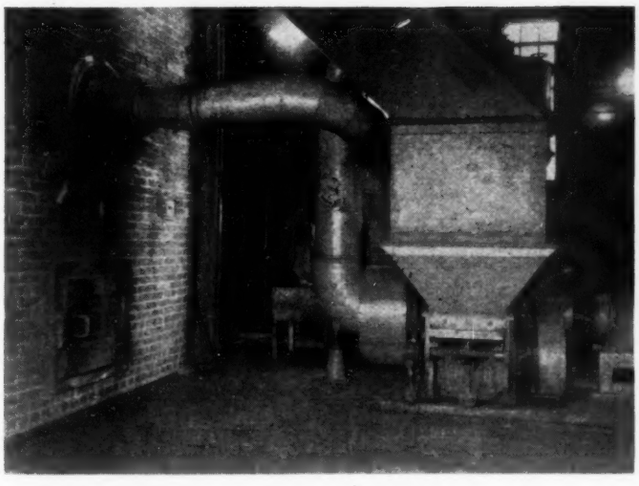


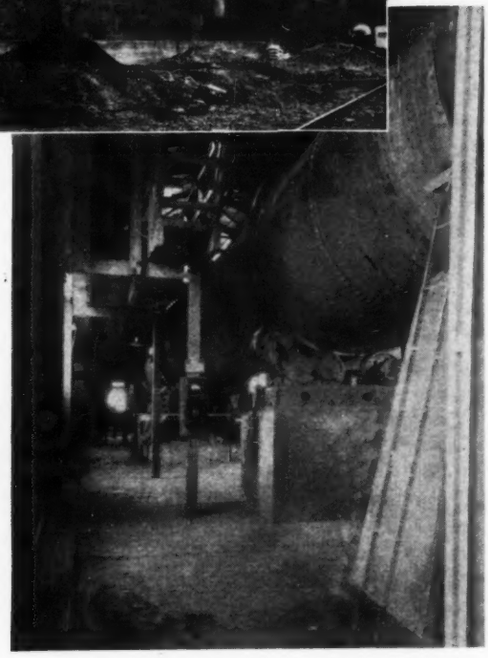
Unit Heaters Have Solved the Heating Problem



The Drying Equipment Is in a Separate Building

Unit Pulverizer on Furnace to Dryer





Heat Dryer—the Largest Equipment Unit Used in the Coal Mining Industry

this product can be loaded directly into the railroad car via a loading boom or, by elevation of this same boom, be diverted to a crusher for conversion into steam coal. If desired, however, all or any of the smaller sizes from the washery and drying plant can be merged with the plus 4-in. This mixture is made by adjusting gates under the flights of mixing conveyor 13, which discharges onto the end of the picking table.

Incombustible refuse from the picking table is directed to the rock conveyor, 11. The upper strand of this same conveyor takes the middlings product from the table to a small crusher, from which it is joined to the main feed to the wash box.

The wash box is a five-compartment unit which operates in a closed water circuit. Make-up water is provided by two deep-well pumps, the requirement being about 15 g.p.m. This make-up water is put into the system via the fine coal or slurry settling tank. Thus the coal is washed with water under a constant head.

Washed coal passes first over a fixed dewatering sieve and thence to a bank of sizing shakers which yield three nut sizes (4x3½ in., 3½x1½ in., 1½x¾ in.) and a minus ¾-in. residue. These nut sizes can be loaded separately, in combination by themselves or, as before explained, in combination with the lump. After further dewatering, the minus ¾-in., following or without heat drying, can be combined with the nut and/or lump; if desired it can be loaded separately.

For convenience of illustration, in Fig. 1 the minus ¾-in. from the sizing screens is shown passing over only one bank of dewatering screens, whereas, in the actual installation, it is split between two such banks. When this coal is not dried, it is raised by a bucket elevator for direct loading. Otherwise, it is taken into the drying plant.

The drying plant is housed in a separate building and is fed by a belt conveyor which is sheltered by a connecting gallery. Wet coal is deposited by a spiral lowering chute into a storage bin having a wedge bottom. From there it is fed by a variable speed screw into the head of the dryer. This unit is a revolving drum, 75 ft. long and 8½ ft. diameter, in which is fixed concentrically a cylindrical shell of 3½ ft. diameter. The coal travels between these two cylinders, aided by the pitch of the drum, and is stirred by a series of lifters which are attached to the inner wall of the outside cylinder. A hot-air blast enters the

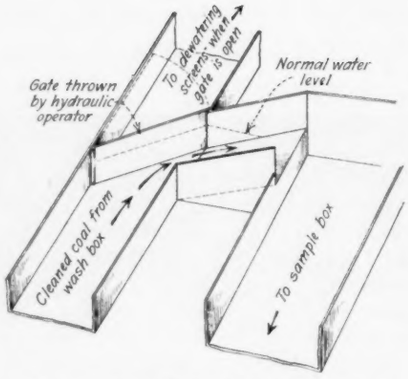


Fig. 2—Cleaned-Coal Sampling Gate

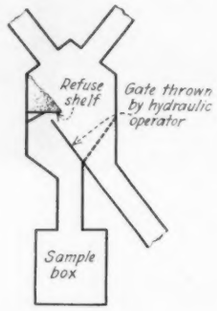
inner shell, travels the length of the dryer, reverses its direction in the coal compartment, and is drawn off by a variable-speed fan to a dust collector.

This blast comes from the combustion of pulverized coal in a furnace which is fired by a unit pulverizer. At the point of entrance to the dryer the blast has a temperature of about 1,150 deg. F., which is reduced to 500-600 deg. at the exit. Between the furnace and the dryer is an excess air port with a damper for regulating the temperature.

From the dryer the coal is discharged onto an elevating flight conveyor. By a system of flap gates and chutes it is discharged onto the intermediate belt conveyor, 28 (see Fig. 1) or, in the event of fire in the dryer, it can be discharged to the outside of the plant. The intermediate belt deposits the dried coal in the bin which feeds the pulverizer. In turn, this bin feeds the coal to the main return belt to the washery.

All motors are 440 volt, 3 phase, 60 cycles, equipped with automatic remote controlled and interlocked starters. Under this system they are started from one point only, but a stop button is provided at every motor for emergency purposes. Klaxon signals operated from several points in the plant are used to communicate with the car dumper who controls the

Fig. 3—Wash-Box Refuse Sampling Gate



central starter. Indicating lights at the dumping station show what equipment is in operation. The total number of motors required to drive the equipment is 42, and the combined connected motor capacity is 606 hp. Power consumption for all operations in the washing and drying plants is 2.54 kw.-hr. per ton of feed. This includes the hand-picking facilities.

Three factors are given weight in considering the goal in preparation at this plant: (1) The cost per ton for reduction of ash to one or another point on the ash scale; (2) The premium derivable from the betterment; (3) The tonnage the markets will absorb of coal prepared at the quality level chosen, as an index of production costs. A median of these variables, struck by charting, is used to determine the best operating adjustment. The washer at present reduces a raw coal averaging 13 per cent ash to a desired clean coal of 6.50 per cent, with refuse of 56 per cent ash content and a yield of 88 per cent, or less than 1 per cent below theoretical.

Of the minus 4-in. raw coal which enters the washery, recent tests showed that 39 per cent is minus ¾-in., 27 per cent is 1½x¾-in., and 34 per cent is 4x1½-in. Rejection averages about 14 per cent of the seam run. This average has been determined by weighing the raw coal before it entered the preparation plant and checking against railroad weights; it includes picking-table reject.

Inherent moisture averages about 1.95 per cent. Surface moisture on 4x¾-in. coal is about 1.5 per cent; that on the minus ¾-in. coal is about 11 per cent, which is reduced to about 5 per cent by drying. Reduction to this value is the practical limit of moisture removal. Drying No. 8 seam coal to a value below this percentage introduces the hazard of firing in the kiln.

The cost of the washing plant is $46,000; that of the drying plant is $56,000. Taking into consideration all factors chargeable against mechanical preparation—plant operation, interest, depreciation, loss of weight through discarding of refuse, together with drying, and loss of coal in the refuse—the per ton cost has ranged from $0.12 to $0.18, depending on the ash end chosen for the runs.

Aside from those points of design earlier emphasized, this plant is notable for several other features. Acid-resisting metals are widely used in chutes, gates, flights, troughs, and other surfaces with which the water of the system makes contact. In sev-

eral instances these are replacements. The water in the system is not acidulous to begin with, but constant recirculation makes it so.

Taking coal by belt directly from a heat dryer, or before it has had an opportunity to cool, introduces a new problem in mechanical preparation. The belt must be heat-resisting. Belt 28, Fig. 1, operates under these conditions. It accordingly has been chosen for its resistance against abnormal temperatures, being a 4-ply, 28-oz. duck impregnated with heat-resisting composition and covered with a $\frac{1}{16}$-in. thickness of the same material.

Heating of the atmosphere within the plant in the winter months is accomplished by unit heaters and radiators. The unit heaters are of the type which has won popular favor, installed in automobiles, consisting of a radiator which heats the air driven over it by a blower fan. Four of these units are installed, one being equipped with 1-hp. motor and three with $\frac{1}{4}$-hp. motors. Steam is carried by vacuum from a boiler with a capacity of 9,500 sq.in. of direct radiation operating at a pressure of 15 lb., maximum.

Of the many improvements made during recent years in the "smaller things" contributing facility to cleaning plant operation, few are a greater boon than the automatic sample gates developed at this plant. These gates, 15 and 16 in Fig. 1, for sampling cleaned coal and wash-box reject, respectively, involve a new application rather than new design of electrical and mechanical principles.

Fig. 2 is a schematic sketch of the mechanical arrangement on the gate for sampling cleaned coal. The gate is hinged to swing across the runoff launder which takes the float to the dewatering screens. When closed, this gate obstructs the travel of coal in its normal direction. The dam thus formed forces the coal to change its direction 90 deg., to ascend a chute which rises to a point above water level, and then to cascade downward, after a second 90-deg. turn, through a chute which descends to a sample box. This box will hold 2,000 lb., but the average sample seldom exceeds 1,000 lb., and is quartered to 100 lb. for laboratory testing.

The gate is operated through a 600-lb. hydraulic operator which in turn is controlled by two definite-time relays. One of the relays has a range of 2 to 33 minutes. When this relay trips, the gate closes and is held closed by the second relay which has a range between $\frac{1}{2}$ and 33 seconds. Normal setting for the slow relay is 15 minutes; that for the fast relay is $1\frac{1}{2}$ to 3 seconds, according to the sample wanted.

By these means a true sample of the entire run for the shift is taken automatically. It is a true sample because it is a composite of cuts, between, and for, each and every one of which time intervals are accurately fixed. The errors of choice, characteristic of hand sampling, are entirely avoided.

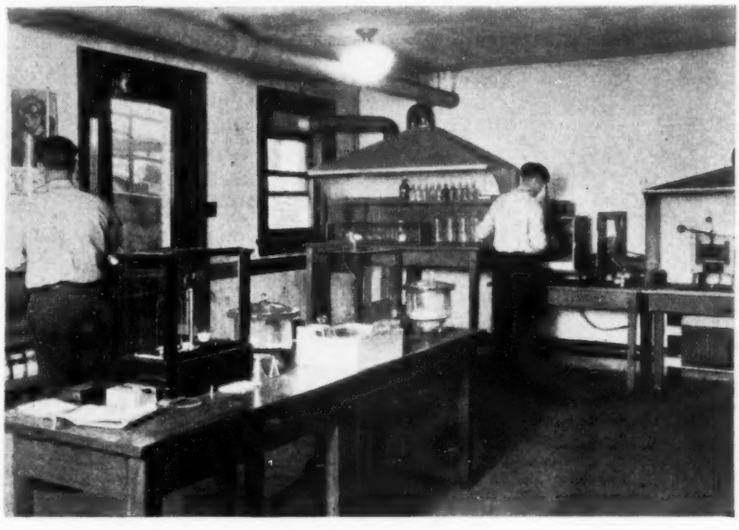
In its principles of operation the gate which samples the refuse rejected from the wash box differs merely in details from that just described. Instead of a fast and a slow relay combination, two slow relays are used. One of these is set for 15 minutes and the other for 2 minutes. Fig. 3 shows the mechanical arrangements.

The problem of taking samples of raw feed to the coal cleaning unit has been simply and satisfactorily solved, although the method is not automatic at the present time. A gate hinged in the center is installed in the short chute which feeds the coal into conveyor 13 from conveyor 5. This gate is operated by hand at definite intervals and as half of the gate turns into the coal stream a positive cut is made, as large a quantity being obtained as desired.

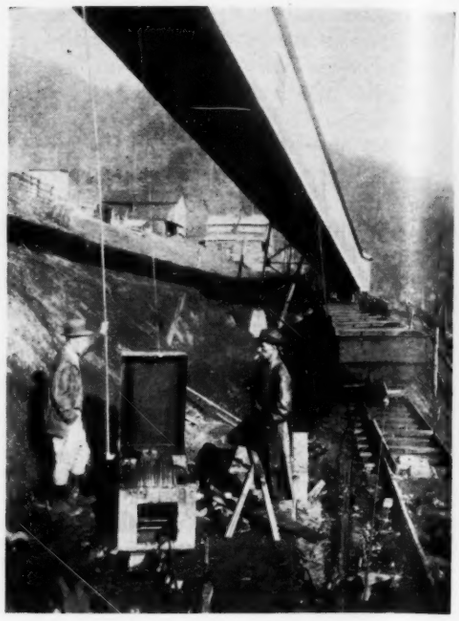
Cleaned coal and refuse cuts, as already indicated, are made at 15-minute intervals during the operation of the plant. These samples are crushed, quartered, dried and prepared for the laboratory, where ash determinations are made, and the wash box operator is advised of the results at the start of the next day's run. Raw coal samples of a day's run are taken weekly.

Periodically, float and sink studies are made and channel samples taken to observe the changes taking place in the seam and the cleaning possibilities determined. Tolerance of plus or minus 0.25 per cent ash in the clean coal from the required ash point is allowed the operator.

Where Ash Determinations Are Made



MACHINE LOADING +Speeds Development of Revamped Virginia Plant



Loading the 8½-Ton Drop-Bottom Cars Which Carry the Coal From the Foot of the Belt Conveyor to the Tipple; Trip Is Controlled by Car Retarder

MACHINE loading of coal and rock has effected an attractive saving at the Pardee (Va.) mine of the Blackwood Coal & Coke Co., which is developing the High Splint seam. On April 1, the company had completed plant improvements at a cost totaling close to $175,000, a large part of which sum was spent for a rope-and-button and belt conveyor system half a mile in length to replace a combination of aerial tram, track haulage, and self-acting mine-car incline.

Pardee is located in Wise County and within a mile or so of the Virginia-Kentucky line. The mine has served domestic and railroad markets and the production has come principally from the Parsons seam, which ranges from 12 to 13 ft. in thickness. This coal outcrops high on the mountainside, and another seam, the High Splint, averaging 4½ ft. in thickness, lies 344 ft. above it. High Splint coal commands a premium in the domestic market, so a few years ago this bed was opened in a small way. The coal was lowered down the mountainside to the Parsons Seam by aerial tram and from this level both coals were lowered to the tipple tramroad by means of a self-acting mine-car incline.

This incline was sufficiently steep in places to cause an extreme spillage of coal if cars were topped moderately. From the standpoints of safety, labor cost, coal loss, and wear and tear on mine cars this incline left much to be desired. When the economic urge called for opening the High Splint seam on a large scale, it was vital that the car incline be replaced by a more efficient method.

As indicated in Fig. 1, which sets forth the old and new methods of transportation, the improvement consisted of building a rope-and-button conveyor 970 ft. long on a pitch of 18 deg. 45 min., another 1,015 ft. long on pitches of 19 deg. and 27½ deg. joined by a vertical curve, and a belt conveyor 265 ft. long on a pitch of 4 deg. At the headhouse of the railroad tipple, which is nearly a mile from the lower end of the conveyor system, a 100-ton steel bin and dumphouse for drop-bottom cars, and an elevating feeder conveyor to deliver the coal from the bin to the existing flight conveyor leading down to the four-track tipple were erected. In Fig. 6, the white buildings at the upper right represent the only changes made at the tipple location. The conveyor system and other improvements were built by the Fairmont Mining Machinery Co.

Fig. 5 is a distant view which includes all of the conveyor system except the lower end of the belt gallery. Drop-bottom cars were selected for the new development in the High Splint seam, and are dumped into a 100-ton bin. The coal is lowered to the transfer house at the Parsons Seam level, where it joins the Parsons coal on the second rope-and-button conveyor. Normal capacity of the conveyor system is 250 tons per hour, but the mine officials consider it has

Fig. 1—Changes in Transportation From Mine to Tipple Headhouse

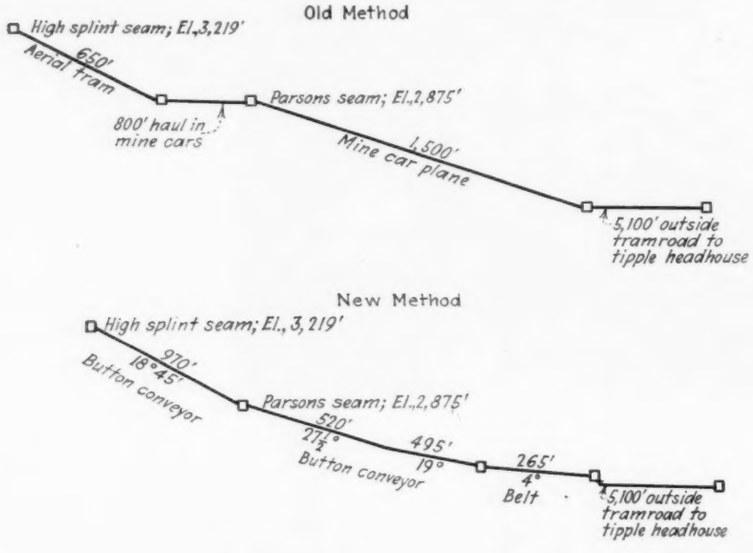


Fig. 2—Loading Rock in a Breakthrough

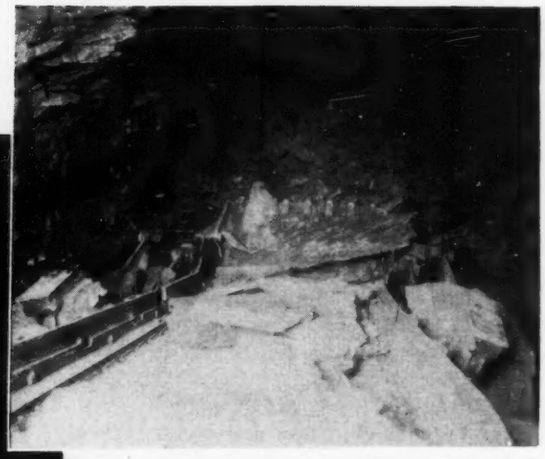


Fig. 3—Head of Machine Loading Rock Shot From Top in Breakthrough

Fig. 4—"A" and "B" Are the Headhouse and Tipple, One Mile by Tramroad From the Bottom of the Conveyor

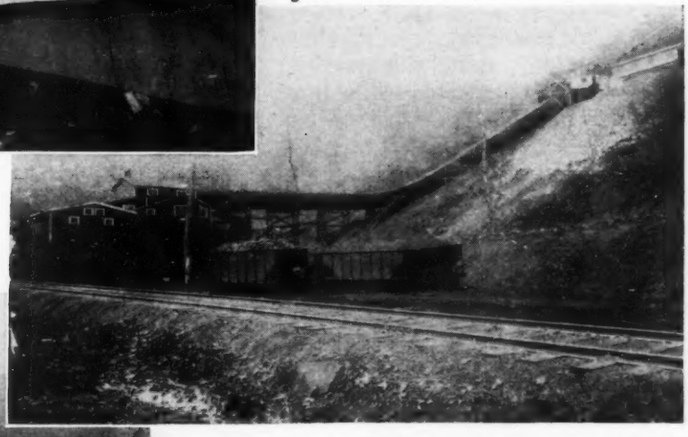


Fig. 6—The Mine Was Already Equipped With a Modern Tipple

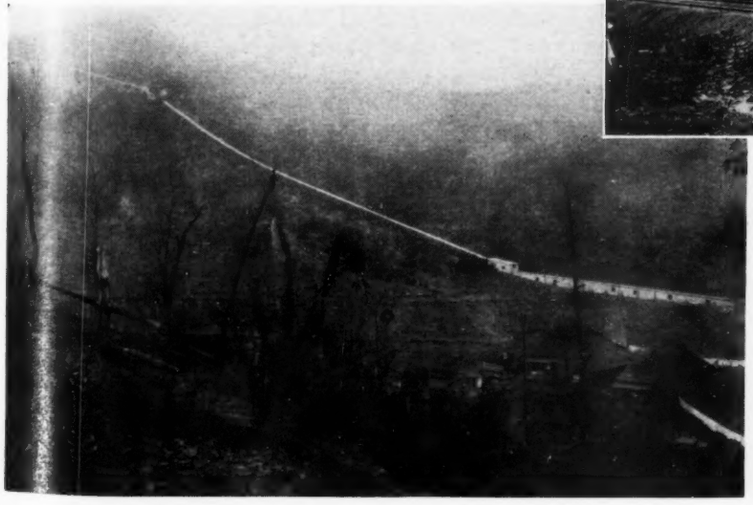


Fig. 5—The Three Sections of the New Conveyor System

an ultimate capacity of 300 tons per hour. Fig. 4, a view from the Parsons dumphouse, shows the lower section of button conveyor, the belt conveyor at the bottom, and the mile length of tramroad leading to the tipple; *A* is the dumphouse and *B* the tipple.

Fairmont patent self-adjusting head sheaves are used on the button conveyors. The ropes are $1\frac{1}{8}$-in. Roebling "Blue Center" 6x19 of alternate regular and Lang lay over an independent steel center. Buttons of 12-in. diameter are spaced on 48-in. centers. Each button conveyor is driven by a 60-hp., 440-volt induction motor connected by V-belts. Under no conditions do the conveyors overhaul the motors and require braking.

The belt, which is 36 in. wide and operates on 265-ft. centers, was made by the United States Rubber Co. It rides on Robbins anti-friction bearing idlers and is driven by a 10-hp. slipring motor equipped with magnetic brake. Transfers between button conveyors and from the lower button conveyor to the belt consist of stationary chutes constructed with pockets where slack accumulates and acts as a cushion and retarder for lumps.

For hauling coal from the belt discharge to the tipple headhouse, twenty Sanford-Day $8\frac{1}{2}$-ton drop-bottom cars have been purchased. They are permanently coupled in two ten-car trips and are hauled by a trolley locomotive. Because of the rapid dumping at the tipple headhouse, made possible by the selection of drop-bottom cars, the locomotive makes the two-mile round trip almost as quickly as the other trip of ten cars is being loaded from the belt conveyor. Thus there is but slight delay to operation of the conveyor system. A Holmes car retarder with motor-drive rope return is employed for controlling the ten-car trips at the belt-discharge loading point.

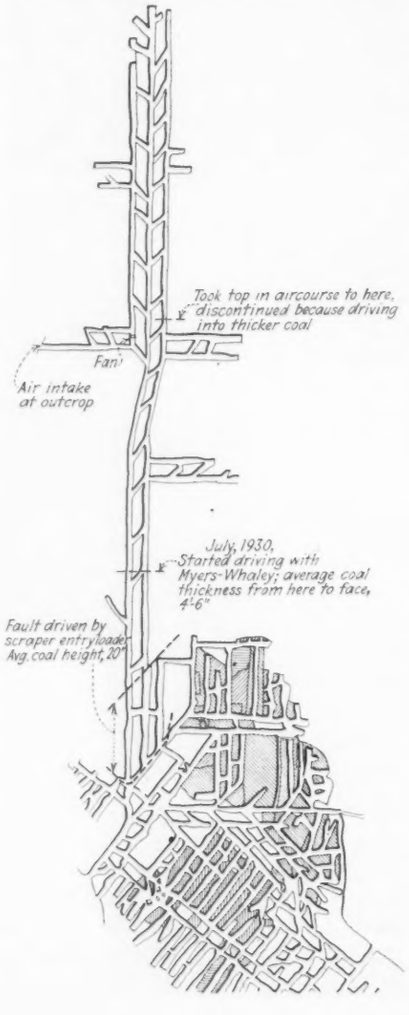
Nine motors totaling 191 connected horsepower operate the new equipment. Those driving the conveyors are operated from three $37\frac{1}{2}$-kva. transformers installed at the Parsons seam level. It required 4,585 ft. of rigid conduit and 31,000 ft. of wire to complete the power and control wiring.

Mechanical loading in the High Splint seam has effected a saving of 40 to 50 per cent in labor cost over hand loading. The average cost of driving 15-ft. headings, taking $4\frac{1}{2}$ ft. of coal and 3 to $3\frac{1}{2}$ ft. of top or bottom rock, has been $2.24 per linear foot. This figure covers the cost of cutting the coal, drilling rock, laying temporary track, loading slate and coal by shovel, and all shooting material.

One Myers-Whaley No. 3 "Automat" shoveling machine working two shifts per day has done all of the work. Since its installation, in the latter part of July, 1930, it has driven (up to March 1, 1931) 4,935 ft. of heading. This type of machine was designed primarily for coal loading, but in this case it was equipped with a belt conveyor instead of the original steel apron conveyor and given a trial in loading rock as well as coal. That it has succeeded is attested by the following monthly records of days the mine has worked and amount of heading driven: August, 25 days, 846 ft.; September, 24 days, 759 ft.; October, 23 days, 781 ft.; November, 19 days, 666 ft.; December, 17 days, 536 ft.; January, 23 days, 706 ft.; February, 16 days, 642 ft. The average is 33.6 ft. per day, or 16.8 ft. per eight-hour shift, for the whole period.

The High Splint mine, tapping a 3,000-acre area, is shown in Fig. 7. When it was decided to develop a large territory beyond the small area already mined, scraper loading equipment was employed for a time in driving the triple-heading main entry. These headings were driven wide in the coal, and the rock was then gobbed along one side. When a fault was encountered, one heading was dropped and the other two were driven by hand loading of rock and coal until the Myers-Whaley was delivered.

Fig. 7—Old Workings and Recent Entry Development in the High Splint Seam



With the loading machine the driving of the two headings and the taking of top in both was continued to a point near an outcrop where a fan was to be installed. Here a third parallel heading was started, but top was no longer taken in the outside or aircourse headings. In these the coal is hand loaded.

The Myers-Whaley loads the coal in the haulage heading and in the breakthroughs, and loads the rock in this heading and for sufficient distance in the breakthroughs to provide height for the machine to reach the last breakthrough cut of coal. Top is not taken at the ends of the breakthroughs adjacent to the aircourses.

In order that hand driving of aircourses can keep up with machine driving of the haulage heading and breakthroughs, additional working places are provided, when necessary, by driving a section of aircourse from a breakthrough and continuing until it connects with the next section of the aircourse.

The coal is drilled by hand and is undercut with a Jeffrey 35-A machine equipped with 9-ft. cutter bar. Rock drilling is done with a jackhammer. Auxiliary blowers and fabric tubing provide ventilation for blind ends. The gathering locomotive which follows the Myers-Whaley loading machine also serves the hand loaders.

In addition to the 4,935 ft. of heading which the machine drove in the seven months mentioned, it handled the grading of approximately 700 ft. of haulway. Joseph L. Osler, general manager of the company, feels that this is a noteworthy performance, in view of the fact that the machine was designed primarily for loading coal, which duty is considerably different from loading rock.

When the projected development has been attained in the High Splint seam, the Pardee mine will be in position to shift tonnage from the Parsons seam to the High Splint, or vice versa, as the market and relative mining costs dictate.

SECOND OF TWO ARTICLES ON THE
SUCCESSFUL MECHANIZATION OF SIPSEY MINE

HOW SIPSEY MINE + Mechanized With Profit

By MILTON H. FIES
Vice-President in Charge of Operations

and W. M. LACEY
Eastern Division General Superintendent
De Bardeleben Coal Corporation
Birmingham, Ala.

IN an earlier article (pp. 462-465 of the issue of September) appeared an account of the conditions which caused the De Bardeleben Coal Corporation to reconsider the whole problem of operation at its Sipsey mine, in Alabama, with the purpose of determining whether a mechanization project could be devised that would lower costs of mining and haulage. After experimentation with the roof, plans were laid to install larger cars with drop bottoms and to introduce face and gate conveyors.

In many systems of mechanical mining the cost of opening up the faces is an important item. An original plan by which this might be achieved was devised, therefore, with the assurance that this cost could be reduced. The plan has proved satisfactory and has not been changed since the conveyor work started (see Fig. 1). The plan of operation is as follows: From the main entry cross-entries are turned right and left, these entries being on 500-ft. centers. The central heading of each entry is driven 10 ft. wide and has an aircourse on either side 20 ft. wide and separated from the center heading by a 25-ft. pillar. Crosscuts are made on each side of the heading at 75-ft. centers. These crosscuts, however, are so staggered that the distance on the heading between one crosscut on the right and another on the left is only 37½ ft.

Sections for conveyor mining are opened up as follows: After the cross-entry has been driven in far enough to leave a 50-ft. pillar between the aircourse and the first rib of the conveyor section, the outside rib of the aircourse is undercut for a distance of from 150 to 180 ft., depending on the character of the roof. A crosscut in the center of this space has been selected as a loading hole and top brushed for a distance of 15 to 20 ft. to the same height as the entry, this being done so that the end of the main conveyor can be elevated to a height that will permit the coal to be discharged into a mine car. After the rib of the aircourse has been cut, the right and left sections of the face conveyor are arranged in position, the loading heads of these face conveyors being placed so that they discharge their coal onto the main conveyor, which in the meantime has been extended from the center of the entry to the outside rib of the aircourse.

After the face conveyor and main conveyor have been installed and the outside aircourse rib has been cut, loading operations are started. Six miners, working under a foreman, are placed on this 150- to 180-ft. face, and it is their job to load out this cut of coal. A man known as the car trimmer works on the entry, spots the tram cars, operates the conveyors, and trims the coal. A small Sullivan hoist is used at the discharge end of each of the main conveyors to pull the cars past the end of the conveyor as they are loaded.

It was evident that, by preparing the coal at the face on the shift prior to that in which the coal is loaded, the tons per loader could be practically doubled. Hence, it was decided to cut the coal, shoot it, timber the working place, and move the conveyors on a shift preceding the loading shift, so that when the loaders went to work practically all they had to do was to shovel the coal to the conveyor. In other words, whereas a loader filling cars under the old system would load, say, 8 tons, the same loader, with the proper preparation at the face, could load 16 tons or more onto a conveyor.

Another big advantage of conveyor loading is that, as the conveyor parallels the face, the loader never has to "turn" his coal when placing the coal on the conveyor, whereas, when a miner loaded coal into a car in a 30-ft. room, as the car was in the center of the room, much of his coal had to be turned at least from 10 to 12 ft. before it could be shoveled into the car (Fig. 2). All of this turning of the coal, and the small clearance afforded in the room-and-pillar system, made the loading of large lumps of coal out of the question. A miner, from necessity, broke up much of his coal, thereby lowering its selling price materially. More clearance given to the miner in which to handle his coal meant more lump coal, and more lump coal meant a higher sales realization.

The face conveyors in service are only 4 in. high, so that the miner has to lift his coal only 4 in. to get it on the conveyor and to start it out to the entry, where it will be emptied into the mine car. In a 30-in. seam, such as is being worked at this plant, the miner has 26 in. of headroom over the conveyor, and this alone is an important aid in the production of lump coal. When the mine cars, which were 21 in. high above the top of the rail, were taken into the rooms,

it was extremely difficult for the miner to load a large lump of coal, as the car height plus 3 in. for room track, left only 6 in. of loading clearance. Think of the tremendous advantage of having 26 in. of clearance in a 30-in. seam of coal, as compared with 6 in. of clearance in a seam of the same size. Larger lumps can be loaded, and loaded much more easily, for the miner often can roll the lumps onto the conveyor without having to pick them up. Miners find conveyor loading much more convenient than car loading, and that fact reflects a saving in cost to the mine owner.

If the miner loading coal by the car netted 55c. per ton (that is, 60c. per ton, less 5c. for shooting) and loaded 8 tons per day, his earnings would be $4.40. If this same miner was placed on a face conveyor and paid $4.40 per day for his labor, the cost per ton to the company for loading would become about 27½c. per ton, figured on the basis of 16 tons per man per shift. The cutting rate for the mine under discussion on a room-and-pillar system before the change of method was 16c. per ton. The loading rate of 60c., plus 16c. for cutting, minus 27½c. a ton for conveyor loading, left 48½c. per ton to the company to pay for the cutting of coal by the day, and for the shooting and preparing of places.

A preparation shift was organized as follows: Four men were placed on the shift which preceded that devoted to loading. The crew consisted of the following men: one head timberman, one timberman's helper, one machine runner, and one scraper. It was the duty of these four men to enter one of these 150- to 180-ft. faces after it had been cleaned up, and to cut the coal, timber the place, drill and shoot the face, and move the conveyors. Because of the concentration of this work, it has been possible to make a heavy reduction in the preparation cost.

It also was apparent that if faces from 150 to 180 ft. wide would turn out from 80 to 100 tons of coal per day, eleven such faces, with the coal from necessary working entries and face entries, would result in a daily output of 1,400 tons; whereas, to produce the same tonnage with the old room-and-pillar system it was necessary to operate an average of about 40 entries.

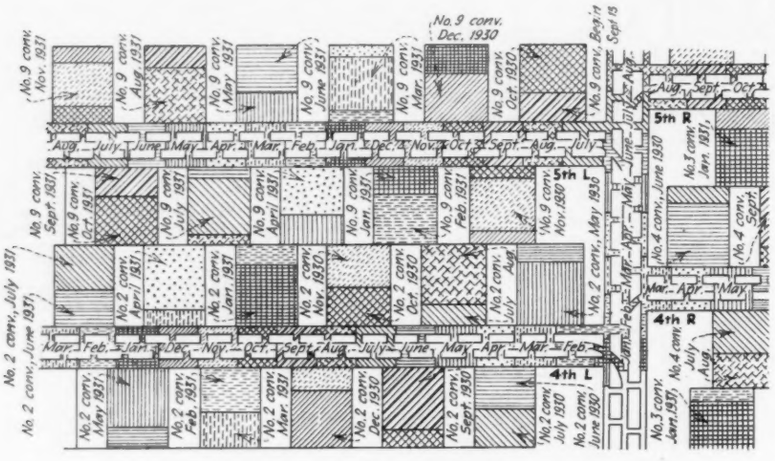


Fig. 1—Part of Projection Map of Workings at Sipsey Mine

Under the old room-and-pillar system, cross-entries were turned every 300 ft., and rooms were driven on each side of the entry for a distance of 150 ft. Under the new plan of conveyor mining, cross-entries have been turned every 500 ft., which makes a net reduction of 40 per cent in entry driving alone. Because of the many crosscuts and room necks eliminated, the yardage cost has been reduced 50 per cent at this mine. The walls are ventilated by blower fans with Ventubes, crosscuts between walls being eliminated.

Work under the old room-and-pillar system was much scattered. Haulage was complicated, but the new system provided means of concentration and eliminated many of the difficulties connected with the old system. Under the superseded plan, eleven locomotives on the day shift and four locomotives on the night shift were used to produce 1,400 tons; whereas, under the new system, six locomotives on the day shift and two locomotives at night produced the same or greater tonnage. The story is best told by a comparison of items of cost involving the bulk of the labor at the mine before and after mechanization, such as mining, timbering labor, deadwork, yardage, tracks, drainage, ventilation, dumping, tallying, engineering, and electric power.

Sipsey mine was completely mechanized about Sept. 1, 1930. The percentage reduction of cost for the last four months of the year as compared to the first eight months is given in the accompanying table. These reductions were accomplished without any lowering of wages. The power comparison is given for the reason that experience at this mine proved that, although twenty-two 5-hp. motors, eleven 10-hp. motors, and eleven 2-hp. motors, a total of 242 hp., was added to the load, the reduction in the number of pumps and haulage motors offset the increased cost of additional power for mechanical loading.

The number of company men at the mine was reduced from 165 to 125, and, of course, the number of men on coal was reduced by nearly one-half.

After the mine was entirely mechanized, with a roof-supporting system of heavy timbering and cribs, the slips in the roof increased the number of accidents from falls of rock. The method of timbering was then changed, as illustrated in Fig. 8, on page 464 in the September issue, setting out the various stages of the timbering; capboards 1½ in. x 7 ft. were adopted, and the conveyors moved forward without being separated. Since the inauguration of the new type long cross-collar capboard timbering, there have been no accidents from falls of roof, and the management believes that hazard has been largely eliminated.

Reduction in Cost Due to Mechanization

Item	Percentage Decrease in Cost
Mining coal.... } Timbering labor	16
Deadwork and yardage.....	50
Tracks.....	48
Drainage.....	38
Ventilation.....	30
Haulage and hoisting.....	32
Engineering in mine.....	13
Electric power purchased.....	No change

As a result of the mechanization, a number of minor accidents were incurred, mainly when timbers loaded on the main conveyor were being unloaded near the face or when bars were carelessly handled in the dislodging of coal. These latter hazards were eliminated by adopting new safety rules regulating the action of employees on this type of work.

One of the advantages resulting from mechanical mining at Sipsey was an increase of from 35 to 45 in

the percentage of domestic sizes, which include all coal over 3 in. It was estimated that, due to this alone, the realization would be increased about 10c. per ton, and this estimate has been more than attained.

Though it is a fact that the percentage of recovery on the advance is not much greater than with the old system, it is also apparent that the width of the pillars left between the faces, varying as it does, from 50 to 75 ft., is such as to make this recovery of the pillar coal more or less easy —certainly easier than under the older system.

The cost of shooting this mechanically loaded coal, which is an item not shown in the tabular figures of percentage reduction, is 50 per cent less than under the old system; and at one other mine on this same seam, which also is mechanized, the cost of shooting has been reduced 80 per cent. Aside from this advantage in cost reduction, the handling of explosives is now limited to fewer men, and these men can be, and are, picked for their experience and care.

Conveyor mining as installed at Sipsey provided a new and most satisfactory method of mine-car supply and spotting. Cars of 3-ton capacity are furnished to the conveyor in trips of ten cars or more, which means that the conveyor-loading crew can be kept busy for two hours or more by the placing of a single trip. One man, known as the car trimmer, with the aid of a small electric hoist, can spot the cars and keep the conveyors in constant operation. The question of car supply and change of cars is an important factor in the operation of any kind of mechanical-loading equipment. It is our opinion that the conveyor system as used at Sipsey provides the simplest and cheapest method of car supply and change.

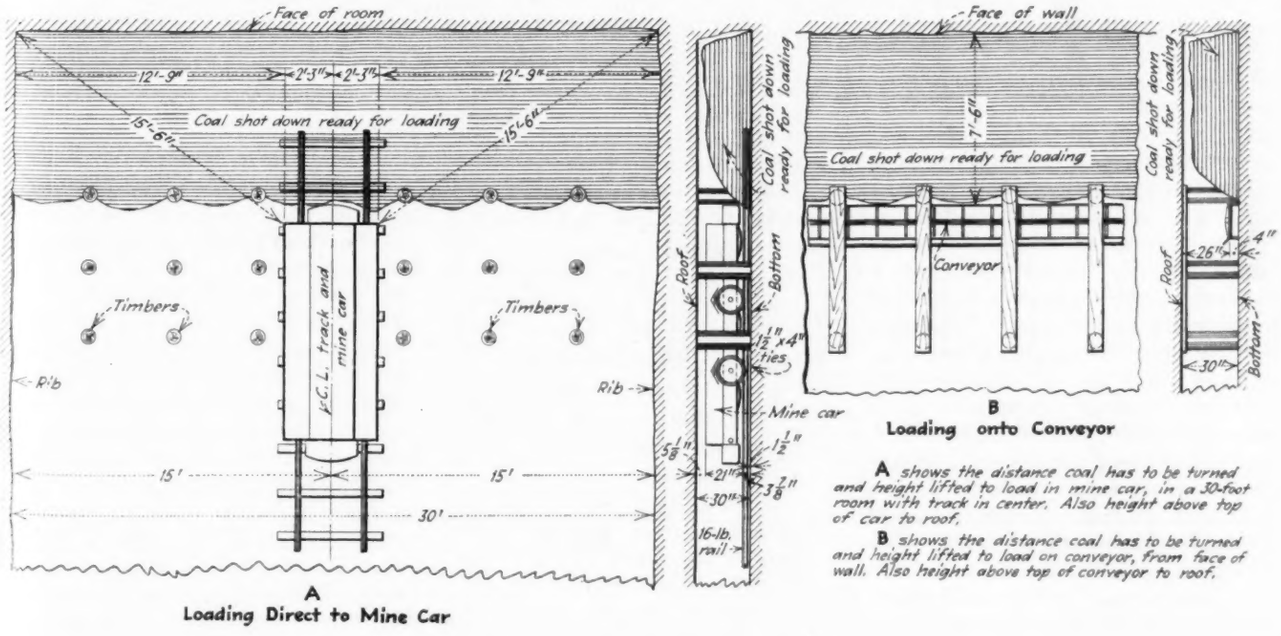
Information gained from experiments over a period of about four years, and now from actual operation, has led the management to believe that the success of mining mechanically in thin seams depends upon a knowledge of roof conditions or roof action. Experience has demonstrated that the nature of roof in one mine, permitting certain lengths and depths of walls, does not determine by any means that the same length and depth of walls may be carried in some other mine having the same coal thickness. In fact, conditions at mines on the Corona seam belonging to this same company, with from 30 to 33 in. of coal, a fireclay bottom in which the cutting machines operate, and a roof much harder and tougher, permitting wider rooms under the room-and-pillar system, would not permit faces over 100 ft. long to be advanced 200 ft.

The above statement is made so that the reader may not assume that conditions in his own mine warrant an installation of the type described. Every operator has his own problem and he should solve it, certainly as far as roof action is concerned, before any heavy expenditures are made for mechanical apparatus.

In selecting the crews by which the first conveyors installed are to be operated, as much care should be exercised as is used in the selection of the machinery. Only such men as are known to be loyal and ambitious should be allowed to initiate such work. Miners usually have a natural prejudice toward any kind of loading machine and conveyor, this prejudice being more pronounced at mines where the contract system has been in operation. By a poor selection of the operating personnel a mine well adapted for a complete conveyor installation can make an entire failure of the project. The conveyor foreman is the key to the problem, and if he is the right type of man, and the roof conditions are fair, conveyors can be made to operate at a profit.

Mine mechanization offers a great opportunity to reduce the cost of production in thin seams having a high digging rate. In fact, it is our judgment that the differential between the costs of producing thick and thin coal will be greatly reduced if thin seams receive the benefit of mechanical equipment. It is our further belief that many seams of coal throughout the country which are now considered unworkable will, as time progresses, and that in a remarkably short while, prove of economic value

Fig. 2—Shows System of Timbering, Distance Coal Has to Be Carried on Shovel, and Clearances When Loading on Mine Car and Conveyor



A shows the distance coal has to be turned and height lifted to load in mine car, in a 30-foot room with track in center. Also height above top of car to roof.

B shows the distance coal has to be turned and height lifted to load on conveyor, from face of wall. Also height above top of conveyor to roof.

STABILIZATION PROGRAM + For Bituminous Industry Wins Widespread Comment

STABILIZATION PLANS for the bituminous coal industry outlined in the program published in the September issue of *Coal Age* (Vol. 36, pp. 469-472) are attracting widespread interest. Since the program was first laid before the industry, there has been a steady stream of comment from high executive officers of producing companies, presidents of large coal-carrying railroads, and manufacturers whose products serve the mining industry. In addition, the program and its implications have been discussed in editorials in a number of daily newspapers.

Because certain of the specific proposals made in the program directly attacked questions which are highly controversial, the editors anticipated that comments upon these phases of the plan would develop sharp differences of opinion. They have not been disappointed in their expectations. These differences will be outlined in subsequent issues of *Coal Age* as each of the seven major objectives set forth in the program is analyzed in detail.

Comment on the program as a whole, however, was distinctly favorable. By far the greatest number of letters received up to the time this issue of *Coal Age* went to press—even from those who are frankly pessimistic on the chances of bringing the industry into the necessary cooperative frame of mind—register approval of the general plan. There was a second group that expressed general approval coupled with definite objections to one or two of the seven proposals. Only a small minority recorded opposition to the program in its entirety.

"The program," writes one Indiana operator, "is the best treatise on the various ailments of the industry and what to be done about them that I have yet seen. The seven proposed remedies are what we need—and the patient cannot be cured unless he takes all of them." Another operator in the same field says: "Your conclusions are sound."

Far less enthusiastic, however, is the viewpoint of still another Indiana coal man, who declares: "If it were possible to accomplish the things suggested in your plan, the bituminous coal industry would be on a more stable basis than it has ever been in its history. Bitter disappointments and unfortunate experiences in cooperative attempts to correct the evils of the industry compel me to express the opinion that leadership within the industry capable of securing unanimous support for any plan will be impossible to find."

For Stabilization

The stabilization program published in the September issue of *Coal Age* sets up the following seven points as major objectives in a campaign to put the bituminous industry upon a profitable, healthy basis:

1. **Production control.**
2. **Sound merchandising.**
3. **Stabilized industrial relations.**
4. **More mechanization.**
5. **Coordinated research to develop new uses for coal.**
6. **More consolidations.**
7. **More safety.**

A number of other proposals for stabilization recently have been made public by various groups. These proposals are summarized in an article on page 559 of this issue.

Somewhat the same coloration is discernible in the opinion of an executive interested in mines in Indiana and Illinois, who characterizes the program as "excellent," but voices pessimism "as to whether or not anything can be done. However," he adds, "surely nothing will be done unless an attempt is made." The program, remarks another Illinois operator, "is undoubtedly the stepping stone in the right direction." Any close student, adds a third Illinois executive, will agree with the analysis made in the *Coal Age* program.

The *Coal Age* program is "very good" but it does not "reach what appears to me to be the most vital matters," declares one Illinois operator. These vital matters, in his opinion, are: Fair wage scales, elimination of unfair competition by large consumers, legislation giving some commission autocratic control over the industry, control or elimination of the jobbers, supervision over advertising, complete unionization of the mines, reduced freight rates, and compulsory curtailment of the output of the large mines.

"So long as the spirit of our laws is based on the proposition that the public has a vested interest in the results of cutthroat competition," comments another operator of long experience in the Illinois field, "nothing can be done, and the law of the jungle will continue to operate in full force with lamentable effect upon both the lion and the jackal." This view is reechoed by an Ohio producer, who says: "I believe that the poor old coal industry is going to have to work itself out under the jungle laws."

"It is a mighty big program to be put through," is the word from the head of one West Virginia company, "but, if it could be done, it would be a very excellent thing." Another executive in the same district is ready to agree with "much of the program."

but draws the line at rejuvenating the union. "Practically all of your seven suggestions would be taken care of if the first [production control] were legally permissible," is the opinion of another veteran of the state.

Mechanization is rejected by the head of another company, who indorses the other six objectives. Recommendations with respect to sound merchandising should be added to the proscribed list, declares another West Virginian, who also is dubious as to the advantages of consolidations. "Demechanize!" is the demand of a Southwestern operator, who adds that he cannot accept the idea of stabilized industrial relations outlined in the program.

"I think," asserts the president of a large West Virginia company, "too many articles are appearing today wherein Pollyanna conclusions are arrived at without due consideration of the practical steps necessary for those conclusions." The same view is expressed by a Virginian, who adds, "theories are not likely to solve the present difficulties." This coal-company president, declaring that *Coal Age* has "certainly undertaken a mammoth task," would have committees of "practical" coal men in each major district to study the situation and make "worth-while suggestions" to the industry as a whole.

The *Coal Age* program, says one of the Pennsylvania veterans in blunt dismissal, "is along the lines of all panaceas and nostrums that have been put forth in recent months." And another operator from that state complains that *Coal Age* has presented the picture of a beautiful building, "but you have not drawn a set of plans to hand to the builder." Whether the program is sufficiently specific is also asked by a Wyoming producer who expresses general accord with its purpose.

"Much has appeared in the coal journals and in the public press as to the dire straits in which the coal business is now in," writes one West Virginia operator, "but very few attempts have been made to formulate any definite plan for its improvement. Your program sets forth such a plan." This program, writes another West Virginian, "strikes me as the most complete discussion of the subject I have ever read. I have nothing to add and agree with the logic of each of the items discussed. To work out a program of this scope will be a tremendous undertaking, but it is well worth the effort."

"If the program you have set up could be brought into being," says a Pennsylvania producer, "it would go far toward putting the coal industry on its feet." But, this particular commentator adds, he is unable to agree that this birth and enforcement is possible. "Every constructive plan fails when applied to the coal business," echoes a Maryland operator. "I would eliminate as impractical, stabilization of industrial relations and more consolidations," suggests another Southwestern executive.

"What would be really helpful to the operators," declares another representative of the Blue Grass state, "would be to find out what caused the failures of their many efforts in the direction of stabilization and some suggestions as to how to overcome these obstacles." Eliminate unemployment and most of the ills of the coal industry also will be eliminated, declares still another Kentuckian. Strict government control in some form is the need, insists a fourth spokesman for the field. 'There is no question that practically all the points you have suggested are practical," is the way one large producer in the Kentucky field sums up his opinion of the program.

"The suggestions are so obviously and fundamentally sound in principle that I am unable to note any exception," states a Rocky Mountain operator. How to get them adopted, he continues, is the real problem." What *Coal Age* ought to do now, declares an Eastern executive who approves the program, is to devise some plan which will galvanize operators' associations into action and put the program into effect.

The president of one well-known Virginia company would wipe out everything but sound merchandising and safety from the program. And the head of a Colorado company is inclined to the belief that all formal planning should be eschewed. "Personally," he says, "I like the British system of muddling through much better." Another chief executive from the same state, however, is of the opinion that the program "should be very helpful to the industry as a starting point."

Coal Age is to be congratulated upon its courage in plunging into this campaign, according to several operators. "I says this," adds one, "in spite of the fact that I do not believe in several of the forms of self-help recommended." One of the Pennsylvania producers expresses "great faith and belief in natural and economic laws as contrasted with man-made laws. One of the most powerful is the so-called law of supply and demand."

"A well considered program," comments the head of another large company in the same state. . . .

N. C. A. Group to Study Stabilization Plans

Suggestions for stabilizing the bituminous industry will be considered by a special committee of the National Coal Association at a meeting called for the Biltmore Hotel, New York City, Oct. 21. Association directors in the Virginias, Kentucky, Tennessee, Pennsylvania, Maryland, Ohio, Illinois, and Indiana have been asked to act as members of this committee. C. C. Dickinson, Charleston, W. Va., is chairman. The action was taken at the request of West Virginia operators who met with Governor W. G. Conley at Charleston a few days ago. At that time the Governor discussed modification of the federal anti-trust laws, curtailment of production in competitive states and the payment of an adequate wage to those employed in the industry, and the advisability of a meeting of operators to consider the problems of the bituminous industry.

"Worthy of the coal man's support," says another. . . . "The seven points you mention are all necessary to a final solution of the coal problem," concludes a third. And among other typical comments are: "A tremendous task, but it has strong possibilities" (Alabama). . . . "Along the right lines" (Alabama). . . . "Covers the whole situation thoroughly" (West Virginia). . . . "Would greatly improve the situation. The great difficulty is to get cooperation" (West Virginia). . . . "Unquestionably has merits" (Virginia). . . . "Seems practical if all involved will be open-minded and willing to make a sacrifice." (Pennsylvania). . . . "Agree with most of your points" (Kentucky). . . .

Without exception comment from railroad executives has been both sympathetic and favorable. "Probably every ill from which the industry is suffering," states the president of one of the Southern lines, "is comprehended in one or another of the various heads of the program. The remedies suggested are efficacious, but their practicability remains to be proved. Its accomplishment, even in a small part, would be a blessing to the whole country." The program "represents a practical contribution toward the stabilization of the coal industry," is the conclusion of the president of one of the Western roads. "I agree fully with all you have said," writes another.

"A tremendous program, but not impossible of accomplishment," summarizes the opinion of the president of one of the larger Eastern systems. "With a considerable part of your program we are in full accord," reports the spokesman for another major trunk line. "You have outlined the difficulties of the industry and the possibilities of rejuvenating it with much ability," says the head of one of the important coal-traffic arteries.

"All the seven items appear to us to be sane and sound," states the president of one of the key lines serving the Illinois-Indiana fields. "I like your stabilization program very much," says another Midwestern president. "The program, if accepted by the majority of the coal operators, would be very helpful in producing better results," declares a third president in that territory. "Would be of great benefit to the industry if it could be worked out," comments a chief executive from the Southwest.

Comments from manufacturers also are distinctly favorable. Typical of these are such statements as: "The best analysis that has been made." . . . "More good sense than anything we have read on the subject." . . . "The program should prove productive if given a fair chance." . . . "A step in the right direction and should lead to the organized effort which in the end will produce satisfactory results." . . . "If what is suggested can be accomplished, undoubtedly a better era is ahead for this important industry." . . . "This program, if carried out, would represent a most valuable step in advance for the bituminous coal industry." . . . "The recommendations as to what must be done for the coal industry are sound and practical."

"If you can arouse the determined interest of the larger operators in this program so that they will really in earnest attempt to follow out the ideas which you suggest, I feel confident it will go a long way in restoring a prosperous condition to this most important industry," says an official of one of the biggest manufacturing institutions in the country.

Although here and there a daily newspaper takes mild exception to the fact that the proposal to liberalize the Sherman law was not coupled with a recommendation for government supervision, editorial comment has hailed the publication of the program as a genuinely constructive and forward looking step. "The editors of *Coal Age,*" said the New York *Times,* "have offered an economic 'plan' which differs in several respects from most proposals of the sort. Instead of suggesting Olympian measures for the rehabilitation of all business overnight, it is limited to a single industry. Moreover, it is specific in the recommendations which it makes."

After summarizing the objectives and pointing out that a coordinated program has been offered, the editorial concluded: "Since the present program is the work of disinterested and well-informed observers, it is difficult to believe that it will not receive a hearing. . . . It would immensely encourage American industry in general if, in a period of widespread business depression, the bituminous coal operators should take steps to put their house in order, asking for the cooperation of the government where it is needed."

"Amidst the confusion of counsel on the plight of the bituminous coal industry," began an editorial in the Chicago *Journal of Commerce,* "one clear and sane voice is heard." Contrasting the proposals made by *Coal Age* with certain other suggestions which have been advanced, including the proposed conference of governors to be called by Governor Sampson of Kentucky, this Chicago business publication ends with the suggestion that "the conference of governors could do nothing better than indorse this [the *Coal Age*] program and request Congress at its coming session to permit effective cooperation in the bituminous coal industry."

While raising the question whether it will be possible to secure a modification of the Sherman law without the creation of a government commission, the Philadelphia *Evening Bulletin,* finds the sponsorship of the program by *Coal Age* significant. "Presentation of so comprehensive a program in so authoritative a spokesman of the industry," it says, "is open to reasonable interpretation as indicating that a considerable weight of influence may be counted on in the industry itself for the project of rehabilitation."

"There is no lack of proposed remedies for the ills of the soft-coal industry," remarks the Philadelphia *Evening Public Ledger.* "The latest, and one of the most comprehensive, is that advanced by *Coal Age.* It offers a seven-point program to substitute orderly progress for the law of the jungle. . . . The value of this program is its recognition that these suggestions are of equal importance and interrelated, hence that changes must be made all along the line if the conditions caused by too many mines and too many miners are to be corrected."

"Congratulations to the editors of *Coal Age,*" was the way an editorial in the Philadelphia *Record* began. "Obviously," it says in the course of discussion of the program, "agreements limiting production and fixing prices would not be tolerable without effective regulation by some public agency." The program, it continues, "presumably does not utter 'the last word' on the problem. But it does show that the executives of the industry have definite ideas for working out a solution. It is a pity that a somnolent administration at Washington offers them no cooperation or guidance toward procuring the necessary changes in the laws."

The *Christian Science Monitor,* while questioning whether the industry should be given a free hand, characterizes the publication of the *Coal Age* program as "a move that may be regarded as indicating great

promise." Amendment of the anti-trust laws, it admits, might give the industry a fresh start, but the editors of this newspaper insist that the "spotlight of publicity" should be turned upon every move the industry makes. "It might, however, be even more satisfactory in the long run, both to the industry and to the public, if the operators were to follow the example of the oil producers by seeking the aid of the federal authorities in helping them adjust their own affairs. After all, one of the important functions of government is to help industry, not hinder it."

In the opinion of the St. Louis *Star,* "the troubles of the bituminous coal industry would largely vanish within a year" were the soft-coal producers "to accept *in toto* the plan of reorganization" outlined in *Coal Age.* But this St. Louis paper frankly doubts that the industry will take any action except under the spur of governmental compulsion. Discussing the *Coal Age* suggestions in a review of the address of Dr. Nicholas Murray Butler advocating a change in the Sherman law and greater stabilization of industry, the editors of the St. Louis *Globe-Democrat* see in the address and the program evidence that the problems raised are far from academic. Solution should be worked out by the industries themselves and not, it declares, "by the dangerous and arbitrary methods of government control."

The production-control proposals suggested by *Coal Age* are the theme of an editorial in the Louisville *Courier-Journal,* which asks whether such policies might not be worked out after advance submission of plans for adjustment to the Federal Trade Commission or the Attorney General so that economic salvation might be won without fear of prosecution. As the editors of the Fairmont *West Virginian*—long a critic of conditions in the industry—see it, "there are just three things that can happen to coal: A new boom growing out of a new war, which is just a pipe dream; the adoption of the *Coal Age* plan, or nationalization." The place of the union in stabilization is the phase which appeals most strongly to the Wheeling *News* and also to the Chattanooga *News. Labor,* organ of the railroad brotherhoods, takes *Coal Age* to task because complete unionization has not been recommended. The New Orleans *Item* hopes that the program "signifies a new willingness for self-criticism, and also a new access of vigor for self-help."

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Mechanization Principles Take Form As Experience Grows

(Continued from page 526)

It is well to carry out an educational program in order that the foremen may better visualize accomplishments which have been made. The ideas engendered from the comparison of methods and results of others will aid in the development of methods that are most applicable to the conditions at the individual mines.

Some of the older men assume that at their age it is too late to learn the details of management under mechanization. Therefore, they are inclined to block the installation of machines or, if they are installed, do not place their whole-hearted efforts in making them successful. The old story, "it is impractical and impossible," is to be heard regarding new developments in the coal industry, as it has been in others. Mechanization certainly cannot be made successful so long as this mental barrier exists.

Mechanization is making the work of the mine manager and assistants much more intensive than it has been with hand-loading practices. Real managerial ability is necessary with mechanical loading. The men who have this ability will be given more recognition than heretofore, and the day of "bulling" results is rapidly passing.

Engineering is playing a more vital rôle in the operations using loading machines. The necessity for accurate planning of mining methods to be used, and of proper choice of equipment in the modern coal plant, is increasing the demand for technical ability.

In the opinion of some, it will be difficult to maintain production from machines after the first glamor of operation is past. If the production does fall on this account, only management is responsible. But the average man must have an incentive to maintain effort uniformly. He must be given a square deal and credit for what he accomplishes.

It is necessary that authority and responsibility be properly delegated. The two cannot be separated. Authority to carry out the details of operation without responsibility, or responsibility without authority, makes for inefficiency. The pride of the average man will cause him to do his best if he knows that he will be given credit for his accomplishments, no matter how small the job may be.

Probably no other forward step in coal mining has ever affected mine labor as much as mechanical loading. The increase in production per man-shift resulting from the introduction of machines has brought about a decrease in the number of men employed, it is true. But labor has fared in the same way in other industries where machines have been introduced to increase the productivity per employee. Invariably, labor has been affected to a greater extent during the development period than at any other time. It is impossible to foretell the time that will be required to stabilize employment conditions, but as it is certain that mechanization is here to stay, the earlier the mines are mechanized the quicker will the adjustment be made.

Mechanical loaders are labor-saving devices, and so tend to decrease the drudgery of hand loading. Many labor-saving machines used in other industries have brought about a great deal of repetitive work. This is not the case with mechanical coal loaders. In fact the reverse is true.

Whatever else is done, it is well always to insure a tranquil acceptance of mechanization by the workers. Unless labor can be given evidence of the advantages which it will share mutually with the operator through mechanization, operating interruptions will indubitably occur and, as a result, neither party will enjoy the full benefit of mechanization.

Modernization of coal mines will no doubt adversely affect some of the owners, operating personnel, and labor, but it will serve the greatest good to the greatest number of people. It is a step toward the stabilization of the coal industry.

In subsequent articles Mr. Caine will consider face preparation, haulage, maintenance, and cost accounting

COAL AGE

SYDNEY A. HALE, *Editor*

NEW YORK, OCTOBER, 1931

Congratulations!

THE DECISION of the National Coal Association to make its directors in the producing states east of the Mississippi River a committee which will meet in New York City on Oct. 21 for the purpose of reviewing proposals for the stabilization of the bituminous coal industry is both wise and courageous. Such a meeting should go far in blunting the criticism so frequently made that the industry opposes every suggestion for help from outside sources and refuses to do anything to help itself. Because there are so many conflicting elements to be harmonized and also because the industry embraces too large a group blindly committed to a policy of *laissez faire*, the caution of timidity easily might have induced the association to withhold sponsorship of such a meeting.

To attempt to predict the outcome of the New York deliberations or even to suggest an agenda for the discussions would be a fruitless flight into speculation. To expect any final decisions from this initial gathering would be stretching optimism unduly. If it be true, however, that out of a multitude of counsel cometh wisdom, then, from the many plans for the restoration of the bituminous coal industry to prosperity which have been made public in the past few weeks, something ought to be developed which will yield results commensurate with the efforts involved in their practical application.

What is fly ash?

PRINCIPAL among the subjects for coal-mining research is to find a use for the ash of pulverized coal, part of which is spread by the wind over the surrounding country and part hauled in scows to the sea or laid on land to rest, if it will rest and not be blown over neighboring lots and fields. Not a few analyses of ash have been made. Many years ago the constituents of the aggregate were ascertained by chemists, but as to the constituents of the individual particles nothing is known.

One particle may be of potash, another of aluminum oxide, another of silica, a fourth of soda, a fifth of lime, or every particle may have in its make-up all these and more radicals in a state of combination. Or, again, it may be that all the particles may be complex, yet less complex than the aggregate. Thus some particles may have such a large percentage of alumina that they could be used for the same purpose as bauxite, which includes the manufacture of shining pots and pans and aeroplane structural material. Unfortunately, the turbulence of the particles in the furnace when those particles are at a fusing heat undoubtedly results in much physical contact, chemical reaction, and complexity.

If, however, many particles have a character of their own, it may be profitable to save the ash and separate certain valuable particles from those that are worthless. Thus, aluminum compounds are heavy; silica is light. The aluminum compounds might be dropped first when settlement takes place in a settling chamber, or possibly even last, because of their greater fineness—if they are finer, a matter for determination. Then again the potash could be dissolved from the mass of particles, whether large or small.

Reasons for believing that the structure of the various parts of the plants which form the peat bog is of varied chemical character might be elaborated. Similarly, certain reasonings of geologists might be advanced—with greater dubiety, however—as reasons for believing that even the ash that is not part of the plant may have been subjected in the course of many eons to an action that would break down shale to clay, and clay to gibbsite, bauxite and diaspore, to be converted in the heat of the furnace into alumina.

Research into the character of fly ash, therefore, seems justified, for there seems to be a determination on the part of municipalities to insist on the suppression of furnace dusts. Such action would deal a heavy blow to pulverized coal plants and, therefore, would make unsalable the finest of coal.

One more reason perhaps

DURING recent months the trend of accidents, both fatal and non-fatal, has been definitely downward. In fact, so decidedly improved is the rate that, searching back the records of coal-mining accidents to their beginning, one can find no parallel, even for periods of prosperity.

Certainly there are reasons for this sustained improvement in the midst of business adversity. Casting about for these, the inquiring mind is arrested by the propensity for good of the safety program lately sponsored by the National Coal Association. There can be little doubt that the many threads of this movement have been woven deep into the texture of the protective fabric.

But this does not entirely exhaust the virile possibilities. Some other influence may be building the woof if not the warp. Can it be that because men are sticking to their jobs, they are becoming more intimately familiar with a fixed set of working conditions?

An analysis of recent records would quickly reveal whether stability of labor is adding strength to the cloth—or whether it is merely shoddy. It

appears as if the time is opportune for such a study. If the evaluation proves to be positive, it would do much to sell the industry on sounder industrial relations, the little-used needle for the weaving of safety.

The Swope plan

WHETHER or not one agrees with the Swope plan for the stabilization of industry down to the last comma and period, it is impossible to withhold tribute to the vision of its author and the sincerity which underlies its presentation. Moreover, the concrete proposals set forth by Mr. Swope for the discharge of the social obligations of industry are in refreshing contrast to the Pollyanna generalities cascading from the lips of too many spokesmen seeking to explain how the world may get rid of the débris of the wreck of "the new era" and restore security to a nerve-shattered mankind. The Swope plan, because it is so specific, may and will provoke controversial discussion; but the tangible premises it gives for debate are not the least of its virtues.

The core of the plan, of course, is compulsory membership in trade associations which shall exercise functions far beyond the scope of the present activities of most business organizations. To give the association the powers he feels necessary for carrying out his program, Mr. Swope proposes legislation liberalizing the anti-trust statutes but at the same time bringing the association under the direct supervision of some federal department or commission. This same idea of relief at the price of submission to another form of government control also is integral to the proposals for stabilization recently made by committees of the Chamber of Commerce of the United States and is part of the Sherman law modification plan of the American Bar Association. Mr. Swope believes that this can be done without destroying individual initiative in business or killing the incentive for progress.

With this machinery, he would establish two major objectives: stabilization of industry, with consequent regularity and continuity of employment, and insurance for the worker to cover the risks of accident, death, disability, unemployment and old age. With the exception of compensation, the insurance would be accumulated through the joint contributions of employer and employee and, under certain conditions, the employer's contribution would follow the worker should he accept employment elsewhere. This, of course, is a great advance over the common plan of making enjoyment of the benefits of employer contributions contingent upon the employee remaining with one company until death, disability, old age, or unemployment separated him from the payroll. It is evidence of the new sense of social values which animates much of present-day industrial thinking.

Production, as Mr. Swope points out, rests upon consumption, and mass consumption depends primarily upon the buying power of the wage earners and their dependents. "That they may be able to buy and satisfy their needs, they must not only have adequate incomes but must be sufficiently assured of the future to feel that they are safe in spending their money. The psychology of fear must be removed." Shall industry, he asks, wait for society to act through its legislatures or shall industry "recognize its obligation to its employees and to the public and undertake the task?" The price of industrial liberty is not masterly inaction.

Let Nature speak

IN medieval Europe, the spiritual, physiologic, and psychologic qualities of things were believed to affect their chemical qualities. In this generation, our imaginings usually are based on science, but too often science is a stumbling block and not a help. Again and again science condemns experimentation based on a guess and not on scientific reasoning. Thus many experiments are not made, just because the imperfect science of the day does not countenance their probability.

A few years ago, the agriculturists believed that, as all the carbon of vegetation came from the air, it was useless to apply anything but non-organic materials to soil, except such organic material as supplied nitrogen and non-organic structural materials. Because most of those who advocated the possibility of using coal believed that the plant drew its carbon from the ground, the suggestion that experiments be made met with only scientific scoffing. Vegetation, said the scientist, might be plowed into the ground, but vegetation contained non-organic materials, it also developed bacteria. Its carbon was a useless constituent.

So many factors regarding which no information is available enter into the problem that it would have been better to experiment first and theorize afterward. Recently the Rothhamsted experiment station in England has declared that unless land is fertilized with organic matter, after a period of years it will lose some of its power to produce grain. German and British wheats lack protein apparently because no amount of non-organic fertilizer will enable vegetation to acquire from the air and soil the protein it needs. Much of the soil in the United States is similarly deficient.

No declaration is intended to be made that the coal will afford this protein; possibly it will not. But there is a remote possibility that coal *might* supply it. At the Champion mine, near Pittsburgh, Pa., it assisted most of the protein-forming crops such as cereals and seemed ineffective with vegetables. On the other hand, in New Zealand it was said to fail with grass, which is in a degree a protein-forming plant. In any event it has been shown that coal has a value for fertilization or at least land betterment. Some day we may know how, when, where, why, and for just what crops. Till then it will be well not to assert or deny too much, but let Nature and not science talk.

NOTES

. . . from Across the Sea

BRITISH coal owners have their own notions of the way in which the Yankee scraper should be used to remove fallen coal from the face. In America it is customary to bring the coal to the heading, but the British are in the habit of carrying a "mothergate," or roadway, into the longwall face and bringing the coal to the inner end of that gate. This has the advantage of shortening the travel to the car, but the considerable disadvantage of making it necessary to shoot the bottom along the mothergate and to gob it along the road. Which is the best way of handling the problem depends on many conditions. If a wide longwall can be safely maintained on both sides of the mothergate, there is little reason to object to the British plan, which has further advantages, as will be seen later.

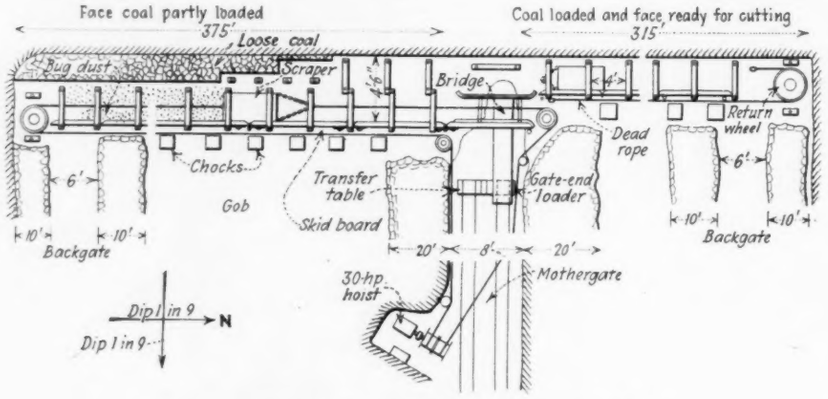


Fig. 1—Scraper Visits England and Acquires a Guide; Installation at Greenside Colliery

At the July 18 meeting of the National Association of Colliery Managers, at Newcastle-upon-Tyne, Shield Rochester described the operations at Greenside Colliery. The seam at the mine varies in thickness from 1 ft. 10 in. to 3 ft. and averages about 2 ft. 3 in. It is a clean seam with about 4 in. of splint coal at the bottom. From Mr. Rochester's description I would think it was a sample of a strong roof with a weak dirt band below it, the two separated by 8 to 10 in. of coal—a roof that the miner needs to watch and test carefully, because of the dirt band, and one that would close up the working regardless of timber if it were not for the walls of hard clay built up on either side of the mothergate and back gates. So those gates have a purpose other than shortening transportation by scraper. By the rock walls which they provide they keep the road open for the coal which travels along them. They also serve to provide for ventilation.

It will be noted in the illustration, Fig. 1, that the coal which has been cut and shot is loaded in three steps, the last man taking less than the other two and setting wood props and steel bars above them as crosspieces as he progresses. About one-fourth of the coal need not be handled by the loaders, as it is already in the track of the scraper. Part of it consists of kirvings (bugdust) which are thrown out by the cutter's assistant; another part is coal which the shot has projected into the path of the scraper.

The scraper loader, which is of Sullivan make, pursues a very orderly existence, going back and forth along a narrow track with none of the flexibility and freedom of movement that marks it in the American mine. In England, because of the need for and insistence on close roof support, it has to run between lines of posts and is held in place on one side by guides, the ends of which are beveled at the junctions (Fig. 2) so that if they tend to bend out of shape they will not unduly displace the scraper.

These guides, or "skid boards," are faced with iron and are laid against a row of props so as to be parallel to the face and 4 ft. 6 in. distant. There are two loading shifts, after which, in the third shift, the rock in the three gates is lifted; the face is cut, drilled and shot; and the skid boards, sheaves, and a row of hardwood chocks are moved forward. In each of the two loading shifts are three loaders. Only one side of the longwall face is worked per day, though with the same equipment both sides could be operated if desired.

One might suppose that the scraper would first clear out its track, and that when that was done, coal would be thrown from the pile at the face into its line of travel. To do so would, in the main, be to load the bugdust first and the larger coal afterward. This would not be desirable. The scraper, instead, starts to load near the mothergate and then works methodically back to the back gate, taking all the coal as it goes, the run of the scraper being adjusted to the needs of the loaders, who signal to the boy at the hoist by an electric signaling system. However, all day long the tail rope of the scraper runs to and fro over the coal in the track of the shovel, reducing part of it to dust.

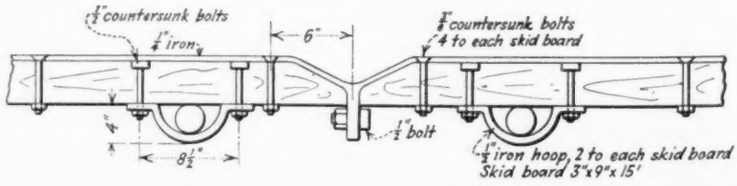
Hardwood chocks are built in a row 18 in. back of the skid boards at about 6-ft. centers. These chocks are made of timbers 2 ft. long and of 4-in. square cross-section. Between the chocks and the skid boards runs the tail rope.

A bridge carries the scraper over the cars which have been placed by a Jeffrey-Diamond gate-end loader. The scraper is thus enabled to discharge its load. The loader is driven by a 5-hp. motor and will handle 60 tons per hour; it can be moved under its own power, which is quite a helpful arrangement when a run, or "canch," of bottom has to be lifted, and the gate-end loader needs therefore to be run out of the way, both for its own protection and to permit the rippers and rockmen to do their work unhampered.

No subject is quite so lively as the dangers of coal dust. Explosions of dust in the mines have had much to do with the unpleasing attitude of the public toward the coal industry. Their suppression is a major interest of everyone producing coal, and it is reassuring that in rock-dusting a way has been found of rendering mines coal-dust-explosion-proof.

In connection with the dangers of coal dust, Prof. R. V. Wheeler's remarks, in speaking before the Society of Chemical Industry Jubilee Meeting, may, with advantage, be quoted. He declared that the lowest concentration of coal dust in air that, properly distributed, would ignite and propagate was 0.02 oz. per cubic foot of air, or 1 oz. in 50 cu.ft. A heading 6x8 ft. in

Fig. 2—Skid-board Joint Overcomes Evil Tendency of Wood Guides to Curl Outward at Ends



cross section has 48 cu.ft. of space per foot of length, so 1 oz. of coal dust per foot of heading will suffice to cause an explosion. Such a concentration would be so dense, says Prof. Wheeler, that through it, one could not project one's sight for a distance of 6 ft. so as to see a miner's or any other 1-cp. electric lamp if held at that point, though the dust when distributed over the 28 sq.ft. of peripheral surface in a 6x8-ft. roadway would be scarcely observable. With ledges in the rock and coal the true periphery would, it may be added, be much more than 28, perhaps even 100 sq.ft.

Maximum explosive violence would be obtained with 0.22 oz. per cu.ft., or 11 oz. per linear foot of heading. That should be the upper limit, said Dr. Wheeler; any more should in theory stifle it, but that doesn't happen, for the speed of the explosion is slowed down with an excess of dust, bringing that excess back to normal. Consequently, there is no possibility of having so much dust as will make a dust explosion impossible. At least one cannot count on such a possibility.

Dr. Wheeler also said that the sparks from a flint or steel, or from two stones, would ignite some gases, but there were few inflammable gases indeed that could be so ignited. In his opinion such sparks could not ignite coal dust; but, unfortunately, the heat produced at the point of impact between two materials giving the spark can ignite a mixture of methane and air and could also ignite a coal-dust cloud. In the latter case, most probably, the initial ignition is of gases distilled by the heat from the dust and not the ignition of the dust particles themselves.

R. Dawson Hall

On the ENGINEER'S BOOK SHELF

The Romance and Tragedy of Coal, by Eugene McAuliffe, president, Union Pacific Coal Co. The Colonial Press, Omaha, Neb. 99 pp., 5¼x8 in.; cloth.

Lifting a series of articles that he has been running in the *Employees' Magazine* of the Union Pacific Coal Co., Mr. McAuliffe has presented the coal industry and the public with an interesting story of coal. As the title suggests, he has laid much stress on the shortcomings in that long record.

To those who have read the history of labor in general, prior to the great historical gift that the coal industry made to the world in the eighteenth century—the beginnings of mechanization—that long record is full of sadness and frustration accompanied with only occasional rejoicing. One cannot therefore, feel as ready with apologies for the condition of coal mine labor, as is Mr. McAuliffe.

The author pays his tribute to the medieval church, and with reason. As it owned many of the early mines there must have been kindliness in the treatment of the laborers in the mining industry, some of whom may have been monks. Many of them were serfs, it is true, but serfdom with sympathetic ownership had its compensations. The workers in the mines were assured a livelihood and were secured against the too-frequent brutalities of the baronial system.

Leaping forward a few centuries, surely there is something of romance, as indeed the author concedes, in the industry that gave to the world the boiler, the steam engine, the pump, the fan and ventilating systems, the locomotive, the safety lamp, gas lighting, iron rails; and, in Germany rope telpherage. So much intelligence in its artificers argues them as men possessing a degree of independence.

When we recall some of their customs, the caviling for places and the practice of setting up a stick and deciding from its fall whether they would work or lay idle, one cannot believe that they were dumb sufferers from the violence of their employers. Independence has been always a mark of the coal miner.

To the reviewer it would seem that there is romance abundant in coal mining. It has had reason, especially in late years, to be proud of its progress. It was early in its use of electric haulage; it has rapidly introduced mechanical cutting, loading, and drilling.

In the days to come when our view of this present time has been mellowed by distance, we shall celebrate its progressiveness, we shall lay aside the defeatism forced on us by continued public censure and our terrible mine disasters, and learn to appreciate our past, for coal men have made more progress in an old and honorable industry than has been made by some other industries that, being younger, had greater opportunities for advancement and, being less restricted as to space, roof support, and explosive atmospheres, could develop more freely. Unfortunately, the public fails to know anything either of the progress in the past or of the advances in the present. R. Dawson Hall.

The Story of Mining. By Martha Gruening. Harper & Bros., New York City. 183 pp., 5½x7 in. Price, $1.25.

If this little book for juveniles had been a trifle less dolorous and if it had reflected more clearly the recent rapid progress of the mining industry, it would have been a delight to commend it to our readers as that book for which they have all been waiting in the hope that when published it would introduce the mining industry to adolescents and inspire them by a narration of its industrial achievements.

Martha Gruening is a pleasing author, by no means lacking in a sense of romance when she is relating the early efforts of the past, but not able to see any romance in present-day operations. Occasionally, where a reference is made to the U. S. Bureau of Mines, we get in her volume a glint of modern progress, but that passed, back we go to the practices of a previous century, or even further.

When one recalls the inspiring books written about other industries and the fair industrial attitude of the publishers of this volume, one cannot but regret that this book should have been written with sepia ink—a color that could be successfully applied in writing about any industry even farming, as witness "The Man With the Hoe." Why does the author entirely overlook the many kinds of cutting machines, loading machines, modern pumps, conveyors, scrapers, rock-dusting equipment, electric and carbide lights, storage-battery locomotives, strip pits, dredges, and shovels with which industry is today equipped? Too bad, we must return for romance to those happier medieval days which produced in Germany the glamorous *bergmänner* and in Cornwall the only less glamorous Cornish adventurers on whom Miss Gruening dwells with so much admiration! If Agricola, whom she so greatly praises—too greatly perhaps—were alive today, how he would revel in the wonderful mechanism this century has contributed to mining!

The book closes with a bibliography. If the books included reveal the sources of the author, one cannot wonder that the book fails to record the mechanical and metallurgical progress of the industry during the present century.

The coal industry, to confine oneself thereto, has had two periods of glorious mechanical achievement, the first around the beginning of the nineteenth century and the second between 1900 and 1931. A long period of stagnation lay between those two periods, though some signs of life appeared between 1890 and 1900 with the more rapid adoption of electricity and the introduction of compressed air into the mines. Something of the present mechanization advance, even if brief and merely suggestive, should be embodied in every book having a title so all-inclusive as "The Story of Mining."

R. Dawson Hall.

THE BOSSES TALK IT OVER

YARDAGE PAYMENT—

Would the Tonnage Basis Be Better?

"Is it as bad as all that, Jim? You look as sour as one of the 57 varieties."

"I got it from the big boss, Mac. He's sore about the high yardage for the last half. Dad claims the measurements are 'way too high, especially on the pillars. We are not measuring right, he says."

"I measured the best I could. Where places had fallen in, I took the pillar boss' figures and checked them on the map."

"Yes, I know, Mac; it's a tough problem. The Old Man now wants to pay for slate by the ton."

"That won't work, Jim," remonstrated the foreman. "The men won't stand for it. They will say they are being robbed."

"Whatever your opinion, Mac, we have orders to try the new system on the first. Tell all the men about this. We want to be fair, so we'll pay them according to thickness, but by the ton. No more yardage."

WHAT DO YOU THINK?

1. Can the Old Man's scheme be made to work?

2. Is it more equitable than the yardage method?

3. What is your method?

4. What faults do you find in Mac's method?

All superintendents, foremen, electrical and mechanical men are urged to discuss the questions on page 546. Acceptable letters will be paid for ▶▶▶▶

Is the plant suggestion-box idea a failure because the reward is too low? Jim and Mac considered this problem in September. What the readers think is told in the letters following.

Monetary Recompense for Ideas Stimulates Real Thinking

Because a coal operation with which I was once connected compensated the rank and file of its employees for workable operating and accident prevention ideas, many valuable ones were proposed. It has been my experience that employees give their foremen and operating officials practical suggestions through a sense of loyalty, duty, and cooperation. I am sure this is true everywhere.

It is a fact, unfortunately, that their cooperation is not always appreciated, to say nothing of their not being rewarded in a financial way, as a stimulus to their constructive thinking. I have known operating officials who were distrustful or jealous of the motives that prompted employees to give suggestions. Many ideas that would have saved their companies hundreds of dollars were pigeonedholed, unappreciated. There are any number of mine mechanics, day workers, and miners who would give their employers money-saving and money-making ideas if the foremen but listened to them and passed the suggestions on to the next higher officials.

I believe the rank and file of employees should be compensated for workable, money-saving suggestions, and that further appreciation of their cooperation and loyalty should be shown in the way of promotions in the direction of proved abilities, when the opportunity is at hand. Compensate the men at least for ideas accepted that are profitable. The officials are well paid in opportunity. W. H. Noone.

Davis, W. Va.

Properly Handled, the Idea Box Ties Bosses and Men Together

Speaking of suggestions and operating ideas, the executive branches of coal companies, in many instances, think that suggestions from the rank and file are not worth consideration. As this type of executive looks at it, the intelligence necessary for constructive thinking would lift the man in the ranks to a par with him, so he discounts and discourages the proferring of ideas.

Frequently a good idea originating in the ranks is worked up and camouflaged by a wily executive, who palms it off on an admiring superior officer as his own, and takes all credit for any beneficial results that may accrue. Nor does he have the common decency to thank the man in whom the idea originated.

Of course, this is not an indictment of the coal industry as a whole. Quite the contrary; I think the caliber of top men in the industry places credit stealers in the minority. However, there is a sufficient number of executives of this kind to leave the impression with the rank and file that they are not paid for thinking. Where this condition exists, whatever is necessary to create the right atmosphere, should be provided.

Of course, when suggestions are paid for, there are bound to be many worthless and silly ideas advanced, and many executives would, rather than go through these ideas, discount as worthless all ideas coming from the ranks. Then there is the executive who thinks he is a superman and who egotistically believes he is the whole operation. He would resent any suggestions from the ranks as an insult to his superior intelligence. So the ranks act accordingly.

In my opinion, operating ideas and suggestions should be solicited from the rank and file, and when presented, should be courteously received and carefully studied. If the contribution is found to have merit, the man presenting it should be given due recognition, either honorable mention, or financial reward, or both. If the idea is found to be worthless, the contributor should be called into the office, and—let me emphasize—on company time, the executive should courteously and intelligently explain to the man why the suggestion is not workable. If this does nothing else, it will create a feeling in the mind of the employee of good will toward the executive, which in turn will react to the benefit of all parties concerned.

When I said "honorable mention" I had in mind a suitable display board located where the attention of the miners would be most attracted to it and here with the man's name, suitable wording would proclaim that the company appreciated this giving of an idea. There is no better method of building loyalty than by appreciation.

If the idea means a financial saving to the company the appreciation will be better shown by adding a suitable cash consideration. It seems to me that it would be rather difficult to make a satisfactory sliding scale, unless it was along the line of a percentage of the saving the idea made possible; and even this, in some cases, would be next to impossible to compute, for, while the life of the operation could be estimated and the savings per day computed, a better idea at a later date might render the first idea obsolete. It would seem the better plan to me for the money consideration to be left to the executive and the man who presented the idea. The right kind of spirit prevailing, a figure satisfactory to both parties could soon be determined.

Along with the ideas and suggestions the management would be learning which of their employees were thinkers, which had initiative, and from these, future bosses, mechanics, electricians, etc., could be recruited to fill future vacancies in the ranks. A bond of inestimable value between men and company would be built along these lines. Thomas James.

Vincennes, Ind.

Oswald Is Now General Manager

That the average miner is chary about offering suggestions toward economical and safe operation is not surprising, inasmuch as the well-paid super and mine manager are presumed to possess the wisdom of the ages, and are reluctant to expose their muddy feet to the men under them. Some time ago I worked in a mine which boasted an imposing sign which read: "We welcome safety and operating suggestions." Nothing was said about rewarding the solicited wisdom, the super presumably feeling that a fatherly pat on the back, garnished by an oily effusion about loyalty and sturdy citizenship would be a good and sufficient sop to the underlings' lowly vanity, while, for himself—well, the Cadillac payments must be met.

It was an expensive mine to operate, because about 2 ft. of drawslate persisted in accompanying each fall of coal. The method of working caused room work to lie parallel with the cleat of the coal and the slate fractures lay almost identical. "Oswald," said John Smith to the mine manager one day while the latter was mournfully reassuring himself that any improvement was sadly absent in making his round of the working places, "why don't you change your method of working and drive your development entries at a 45-deg. angle with the cleat of the coal?" The reply was cool and barely polite: He would take it up with the big guns when he found the time opportune. Six months later a flock of engineers with a battery of transits took possession and the casual suggestion became a fact.

Oswald is now general manager of the company, which has waxed prosperous in the many years since adop-

tion of the idea. And John Smith? Oh, he's still rattling a banjo on the side of a mine car.

In the case recounted, a timely and worthwhile suggestion was made by a man shuffling in the shadows outside the official family domicile, who received not one word of encouragement, not one word of favor, nor a penny of compensation. If coal company officials are sincere in their desire for worth-while suggestions let them guarantee 10 per cent of the yearly saving effected by the company to the author of the idea and give credit where credit is due.

Let supers refrain from laying themselves open to the accusation of being victims of the fear complex; fear that everybody in the neighborhood is angling for his job. The most spectacular successes ever accomplished have been made by men who surrounded themselves with the ablest help available.

ALEXANDER BENNETT.

Panama, Ill.

Let a Board Make Decisions On the Value of Suggestions

A suggestion-box system whereby the contributor is paid a percentage of the saving effected by his idea would, in my mind, be the most effective. I suggest that 10 per cent would be a fair figure. Undoubtedly, if a suggestion is valuable and will save money, the one offering it should be compensated.

The suggestion may be one that will continue for some years and effect an appreciable saving of money. In this case, the man who offered the suggestion should be paid a certain amount of the saving monthly as long as the saving continues, or, if he so wishes, the company should make a cash settlement equal to a smaller portion of the value of the idea based on an estimate of the length of usefulness and saving effected.

The effect on the men will be to stimulate interest in company affairs and problems. It will eliminate all jealousy, for each idea is paid for with a fixed percentage of its actual value, and each person presenting an idea is paid for it on the basis of actual value.

Value should be determined by a committee composed of the mine foremen, the superintendents, and the heads of all departments. This committee might meet monthly and ideas be presented in writing to them. The ideas adopted should be tried for a reasonable length of time before being paid for, in order to determine as nearly as possible their actual value and the saving effected.

Non-acceptable ideas might be paid for, at the rate of $1 each, unless entirely impractical, to encourage the men to present their ideas. Such a system would, I believe, solve the suggestion-box question in a large measure.

M. B. CONNAWAY.
Safety Director,
Davis Coal & Coke Co.

Thomas, W. Va.

Idle Words

Silver-tongued oration is not always a sign of clear thinking. Those men who hold their audiences spellbound by their delivery are not always to be envied for the substance of their speech. Yet many a man who knows he has at the tip of the tongue facts and opinions more solid will sit back in silence because he has a fear of public speaking. To such men it is suggested that they give vent to pent-up expression through the medium of writing. It is dignified, and reaches a wide audience. Try the experiment on yourself. Send in a letter to this department today. Those accepted, of course, are paid for.

How to Draw Out Ideas From the Men Under You

Mac's idea of paying for suggestions according to their merit is a good one and should be a big help in getting the workers to keep watch for ideas that contribute to the betterment of the mines and safety of the men.

I like to talk to the men each day as I meet them in the mines or after work and ask them for their ideas on the work they are doing. In this way you can draw them out and get many good suggestions which otherwise you would miss. Another good way is to have a period for suggestions in the safety meetings, having the men get up and explain their ideas. This makes them feel more at home in the meetings and encourages a rivalry among them which will cause them all to put on their thinking caps.

As I would much rather start an assistant foreman from the ranks than hire an outsider, when I find one of my men with suggestions I thank him for his interest and then keep an eye on him. If he continues to take an interest in the mines he gets a tryout when the next vacancy for an assistant is open.

WALTER HORNSBY.

Glo, Ky.

How a Mine Electrical Man Makes His Notebook Valuable

Although I am not directly employed by a mining company at present, I am close to the mine electrical field. Therefore, I feel that I know something of mining problems.

I have kept records of equipment which I have repaired or helped repair for the last ten years. Even when I was employed by mining and industrial plants I kept a record or, rather, notebook. In those days I was not so much interested in costs and kept very little account of them. Most of the notes were of motor nameplates, sizes of gears for an inaccessible pump, or belts and pulleys. I kept everything, even the addresses of mechanics.

Now I generally put down the number of hours required on the job and the rating of the men if possible; also the cost of material used. When no actual figure is obtainable I use what I think might be a fair figure. This estimate of the cost is often an advantage when the boss demands some sort of basic figure on material or when the super asks, "How many men do you need?" If no idea to keep records has occurred to the electrician or mine mechanic, he may not request enough men or he may get too many. Either way, the costs are more than necessary, and will generally slow down the job.

When occasion calls for my connecting up some unusual device which I have in the past wired, I can often refer to my old notebooks and thereby save time and trouble on the job. Every once in a while I get these old notebooks out and look through them. Some of the hurried notes I find hard to understand, which leads me to give this advice: Always date the note and state where equipment is located and what it is used for. I do this now and find little trouble recalling the main features of a particular job.

I have four notebooks at hand as I write. One is dated 1925. On page 11 there is the nameplate and data of a lightning arrester, also the circuit it protects. On page 65 a slope hoist motor and controller are listed. Another notebook pertains to the installation and details of a 700-hp. automatic control of a steel mill motor. The third contains armature winding data for both a.c. and d.c. windings, also various formulas for windings, and sketches of connections.

I have always tried to set down the unusual things because the every-day occurrences would be of no value. I also give information as to whether the job progressed favorably or dragged, the time used, whether in my opinion the time taken was too much, or if the job was done quickly; also if everyone concerned was satisfied and if any trouble developed later. The way I have kept notebooks cannot, of course, be said to be perfect. I have often made notes of which I did not have the location or company. I warn against this sort of notebook. But I must at the same time state that I have often been saved trouble and that my company has benefited by the meagerest of my notes.

I dare say I have at least eight or ten old notebooks. Several I have lost. I carry a loose-leaf notebook with needed formulas in it nearly all the time. Whenever I install equipment I make a list of instruction books and the blueprint number, so that I may write the manufacturer at any time without having to visit the location of the machinery. My notes are short, so the making of them does not interfere with routine duties. When the notebook grows elaborate, its primary function ceases and it becomes a data book.

GRADY H. EMERSON.

Birmingham, Ala.

OPERATING IDEAS

From Production, Electrical and Mechanical Men

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Effects of Overheating Rubber-Sheathed Trailing Cables

RUBBER-SHEATHED trailing cable is ruined or its life shortened by overheating in mine service. Such is the general conclusion drawn in Investigations Report 3104 of the U. S. Bureau of Mines, by L. C. Ilsley and A. B. Hooker, which is based on a series of field inspections and tests.

The tests were made under various conditions of use of 22 cables representing the products of five manufacturers. It was not the purpose to determine the relative performance of cables according to materials and designs "but rather to show the need for larger conductor cables and more efficient power distribution to keep the working temperatures below a value which would produce excessive deterioration and lowered performance of the cable."

Various testing currents up to 300 amp. were applied, and temperatures were measured by means of thermocouples placed in the conductor insulation, near the conductors but not touching them. Two groups of tests were carried out: In the first, the maximum temperature allowed was 220 deg. F., which is the value given by cable manufacturers as the approximate temperature at which definite deterioration of the rubber occurs. In the second group of tests, the temperatures were made to exceed 220 deg.

As a result of the studies, it was concluded that the maximum temperature of a cable with three or more layers on a reel is at the center of the winding. Overloaded cables heat quickly to temperatures which are damaging or dangerous. This action is independent of the type of cable and reel used. But the effect of excessive temperatures is not generally the same on different makes of cable. What variations there are, however, are not apparent until the cables are damaged beyond further service.

Assuming that five layers are wound on the reel and that current flow is intermittent, 10 min. on and 15 min. off, the current values recommended are as follows: Cable size (B&S gage) 4, 60 amp.; 3, 75 amp.; 2, 90 amp. A No. 2 cable should not be used for a motor larger than 30 hp. in a 250-volt circuit or 60 hp. in a 500-volt circuit. Limits for No. 3 cable are: 25 hp., 250 volts, and 50 hp., 500 volts; those for No. 4 cable are 20 hp., 250 volts, and 40 hp., 500 volts.

It was found that the unreeled portion of the cable heats to within only 50 to 60 per cent of the temperature of the cable on the reel. First evidence of cable damage by heat is the odor of gases from the rubber and noise of explosions from blisters in the outer coverings (at temperatures of about 400 deg. F.), but the cable is internally damaged before this deterioration is noted. Softening of the cable and flowing of the inner compound follow. Thirty to 40 per cent insulating compounds regain little of their original strength and firmness, but 60 per cent compounds do recover somewhat.

Blistering is worse on cables covered by two kinds of rubber—i.e., 40 and 60 per cent compounds—in their outer covering. It causes separation of the two layers. As temperatures of 300 to 350 deg. soften the cable rubber, repeated heating tends to destroy the cable. Blistered cables will not withstand moisture, abrasion, and kinking. A temperature of 500 deg. or higher so softens the conductor insulation that tension or side pressure on the cable may short-circuit the conductors.

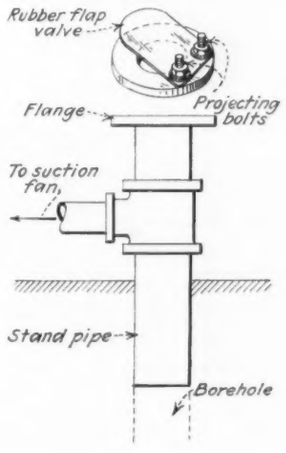
Differences were noted in the behavior of the several makes of cables under test. One make seemed to gas and blister more than the others. Conductor insulation of one cable make softened at 50 to 100 deg. lower temperatures than the others. One make did not blister; though it softened at 500 deg., it recovered much of its firmness on cooling. Though they become charred and lost their strength, jute fillets between conductors maintained their form and position better than rubber fillets. Tape around the individual conductors helped materially to hold the softened rubber in place.

Valve Saves Ventilation Pipe From Damage

Frequently shafts raised from a lower to an upper vein offer a problem in ventilation. The preliminary step generally is to drill a center guide hole which, incidentally, serves to draw fresh air up to the roof of the ascending shaft. This is accomplished by attachment of a suction fan to the upper end of the hole.

The arrangement is satisfactory in all respects but one. When holes are

Percussion of Blasting Opens the Valve, Which Otherwise Remains Closed



blasted, the percussion travels up the borehole and tends to dislodge the pipe which leads from the hole to the fan. A solution to this problem is offered by Charles W. Watkins, Kingston, Pa.

Referring to the sketch, to the standpipe is attached a standard flange. Using the flat surface of the flange as a seat, a flap valve is made of $\frac{1}{8}$- to $\frac{1}{4}$-in. rubber sheet. Two bolts and large-diameter washers hold the rubber in place. The further suggestion is made that the bolts project 4 or 5 in. above the flange so as to keep the rubber from curling up and remaining in an open position after it is lifted by the percussion of a blast.

Testing Polyphase Wattmeter Connections Under Fluctuating Load

CHECKING of polyphase wattmeter connections often causes trouble, especially where the power factor is not known or where there is a continuous fluctuation of the load and power factor. Usually it is desirable to check the connections without interrupting the service. A method described by D. C. McKeehan, chief electrician, Union Pacific Coal Co., has proved advantageous for checking permanent metering equipments or for conducting load tests on individual motors.

If all current and potential transformers carry polarity marks the equipment may be connected in accordance with Fig. 1, with some assurance that it is correct. However, in case the equipment is old or the polarity marks are obliterated from age or have been

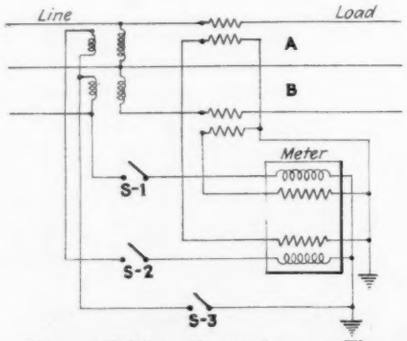


Fig. 1—Wiring Connections as They Should Be

painted over, the matter is not so simple and may be confusing to an experienced electrician.

First, assume that the current and potential leads for phase *A* are connected to the bottom element of the meter and likewise the phase *B* leads to the top element. In case this is not determined, the error will be found in the subsequent tests. Assuming that the meter is connected as shown in Fig. 1, that the magnitude of the load and the power factor are unknown and that the polarity marks are not known to be correct, then proceed as follows:

1. Close potential circuit at *S*-1 to top element of meter and at *S*-3 in the common return wire. If the disk stands still it may be due to the power factor being 50 per cent. Again, the disk may rotate forward or backward.

2. Open *S*-1 and close *S*-2. This element should go forward if the top element stood still or rotated in either direction slower than the bottom element, or should be connected for forward rotation if found reversed.

3. With *S*-1 and *S*-2 closed, open *S*-3. Now the meter should go forward if everything is correct. With the closing of *S*-3 the meter should increase in speed. Make several trials of opening and closing *S*-3 and note that when *S*-3 is open that the speed is reduced to about one-half. When *S*-3 is open the potential coils are in series and operate single-phase, but are connected three-phase when *S*-3 is closed.

With the fluctuating coal-mine load it is often difficult to determine the half- and full-speed condition, as the load may change momentarily. Therefore, the connection shown in Fig. 2 is made. This is done by interchanging the potential leads as shown, when the meter should stop or creep very slowly. In case the above tests prove erratic the top element may be reversed. This necessitates repetition of the entire process.

If one element rotates faster than the other it shows that the power factor is above 50 per cent. When one element rotates forward while the other stands still, the power factor is 50 per cent, and when one element rotates forward and the other backward the power factor is less than 50 per cent. In any event, when the load is constant, the meter should rotate forward at half speed with *S*-3 open, and should stand still with the potential cross-over as shown in Fig. 2.

This method was developed to determine the correctness of connections when the power factor varies from less than 50 per cent lagging to less than 50 per cent leading. With a power factor of less than 50 per cent lagging, the bottom element is reversed, but when the power factor is less than 50 per cent leading, the bottom element rotates forward and the top element backward, just the reverse of the previous condition. The determining test is made by closing *S*-1 and *S*-2, with *S*-3 open, when the meter rotates forward at one-half speed, showing that the energy flow is from left to right, as assumed in the figure.

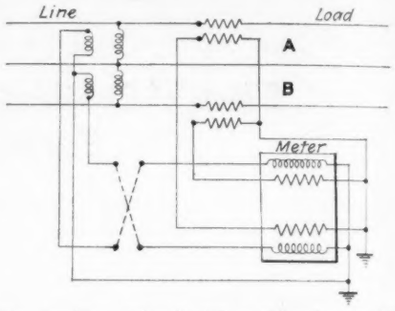


Fig. 2—Test Circuit When Identity of All Terminals Is Not Known

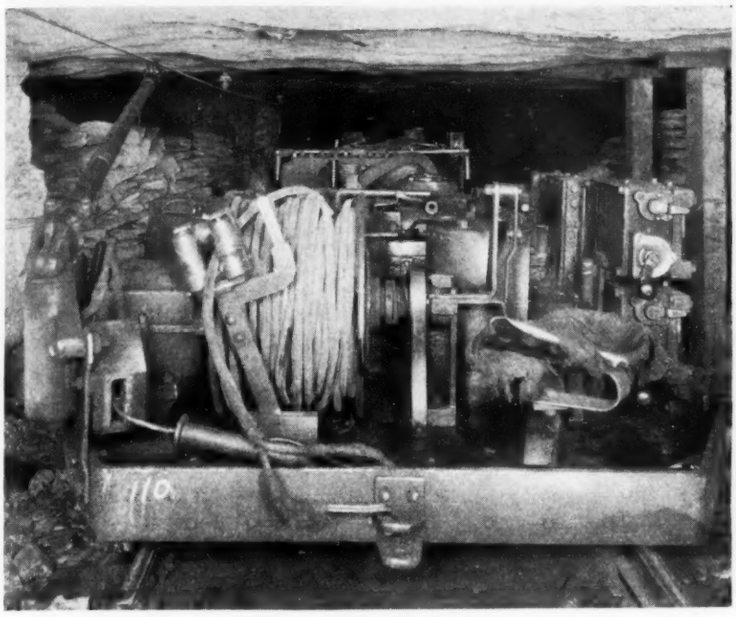
Why Not?

Five dollars is a lot of money these days. Yet that is the amount *Coal Age* pays for each accepted operating idea, such as those appearing in these pages. Of course, the idea must be good; otherwise it will not be accepted. To be good does not necessarily mean that it must be highly involved. Frequently the simplest ideas turn out to be the most worthy. Do not pass up this opportunity for fear the ideas you have put to use may not pass muster. Let the editors make the decision. Having an idea, send it in, giving the necessary details and illustrating with a simple sketch or photograph.

Added Pole Has No Electrical Connection to Cutter

Permissible track-mounted mining machines have replaced all of the open-type machines at Dehue mine of the Youngstown Sheet & Tube Co. After these machines had been placed in service, it became apparent that safety and convenience demanded that a trolley pole be added as a substitute for nipping when tramming along tracks where trolley wire is available.

In order that the trolley pole cannot introduce any live open parts when the machine is operating, no permanent electrical connection is made from the pole to the machine. Power is taken through the trolley pole and track by hooking one terminal of the trailing cable to a terminal at the base of the



Pole Connection Made Through Trailing Cable

pole and the other cable terminal to the frame of the machine.

The illustration shows the tramming connections in place. Note that the fused nip is hooked over a copper pin which is insulated and protected by asbestos board, and that the other cable terminal is grounded to the drawbar. Because trolley wire is not carried into the rooms or near the face of headings, it is obvious that addition of the pole in no way minimizes the safety advantage of machines purchased with explosion-tested electrical equipment.

Switches in Place of Splices Help Mine Telephones

Clearness of sound transmission is achieved by the elimination of splices in the underground telephone circuit at the No. 9 mine of the Wheeling & Lake Erie Coal Mining Co., which is located at Fairpoint, Ohio. Telephones are installed at all important junction points in a circuit of No. 18 twin-conductor, spiral-weave cable. In place of splices the wire sections are joined by two-pole battery switches which also are used in restoring service when a break occurs in the line.

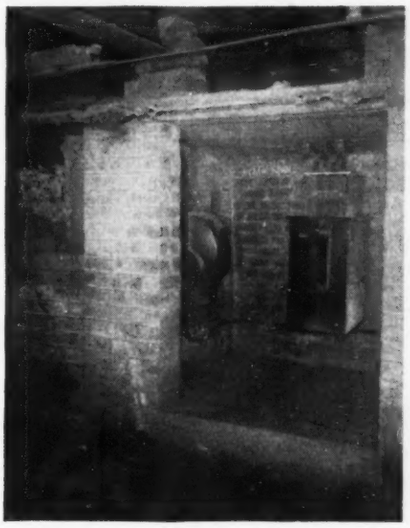
Not only do the switches eliminate the troubles arising from the kind of splices customarily made underground but they facilitate line tests, according to the local mine management. All telephone wires are strung on the rib. The construction of the spiral-weave cable is such that the wire can be laid on the ground and through pools of water and still maintain service. This mine takes advantage of this design characteristic by keeping on hand one reel of the cable for emergency use in the event of fire, etc.

Of course, it should be understood that the management recognizes the superiority of the soldered splice over the two-pole switch connection. Expediency, however, favors the latter method, because wires are frequently broken or opened for testing, in which case, more often than not, mechanical splices are made which are far from satisfactory when completed in a hurry.

Vaults Protect Breakers and Eliminate Fire Risk

Forty-six 275-volt d.c. reclosing circuit breakers are used in the Nemacolin mine. In the accompanying illustration, is shown the standard method of mounting and protecting these breakers.

The face of the vault, which is without door, is flush with the rib line of the haulway. Walls are brick and the bottom and top of concrete. Connected in series with the breaker and on the line side is a single-pole safety switch in a cast-iron box. This switch provides a means of "killing" the circuit breaker for inspection or repairs and also furnishes a means of opening the circuit by hand if the breaker should fail to open.

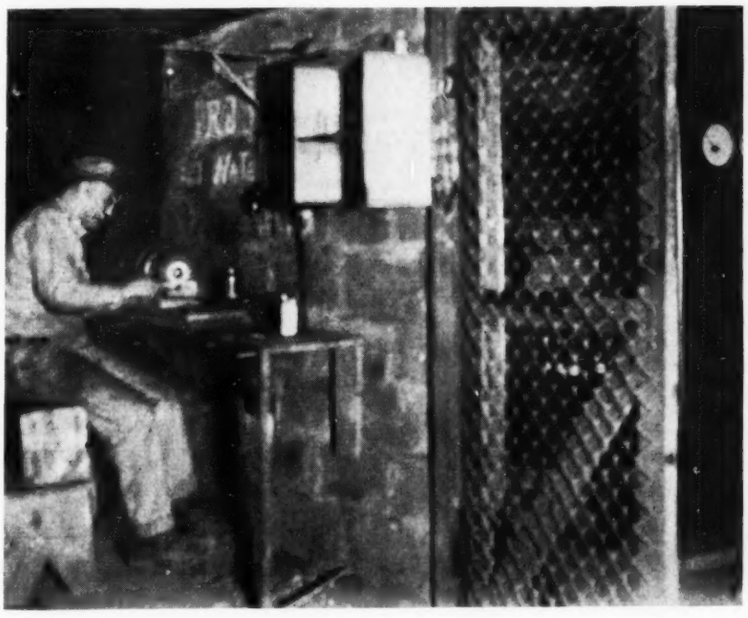


Standard Method of Installing Circuit Breakers

Drill Bits Are Sharpened At Substations

At one of the largest mechanized mines an emery wheel has been installed at every underground substation and at this point the drill bits used in the working section are sharpened.

This Idea Utilizes a Portion of the Non-Productive Time of a Substation Attendant



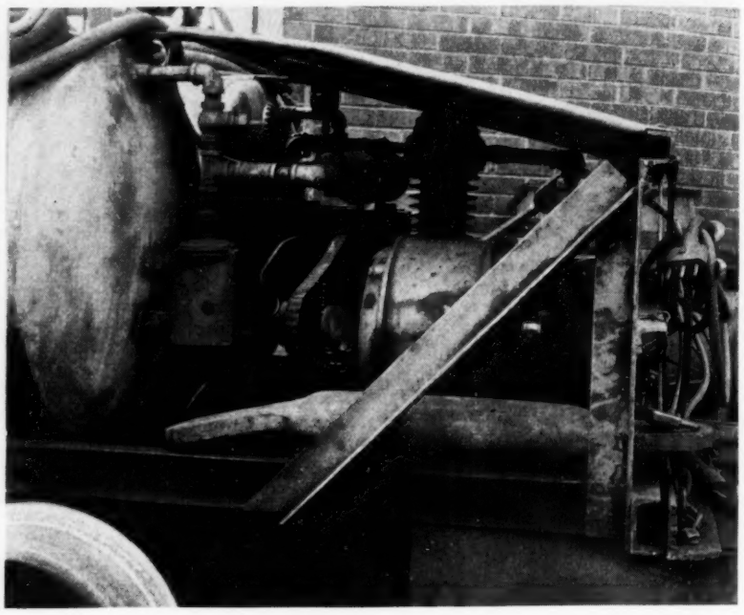
Coal is drilled electrically and the bits are taken to and from the substation by the regular haulage crews.

This practice has manifold advantages. It utilizes one to two hours of the substation attendant's time in productive work each day, and thus saves the expense of handling the work as a special job in the shops. It eliminates long-distance transportation and frequent handling of the bits. It centralizes responsibility. Finally, it improves drilling efficiency by providing a ready supply of sharp bits; for, if need be, the same bits can be sharpened twice during one shift.

High-Pressure Lubricator for Loading Machines

At the Valier mine of the Valier Coal Co., in southern Illinois, loading-machine operation has been guided to a high plane of productive efficiency. Much of this success is attributed to the stringency of maintenance methods which keep the machines in top shape. Lubrication is one of the maintenance steps which are emphasized as being of first importance, and each machine is thoroughly oiled and greased every working shift.

A high-pressure, truck-mounted greasing machine is used for the purpose. This machine is taken to the various sections of the mine by a locomotive, and the machines are lubricated on the job. On the truck are mounted two 100-gal. tanks, one for engine oil and the other for gear-case lubricant. These are filled by gravity. A pressure of 100 lb. is applied to these tanks by a 3x3½-in. single-stage Gardner-Denver compressor which is equipped with an automatic pressure switch. A 2-hp. motor drives the motor through silent chain, and power is supplied from the locomotive through duplex cable and Miller cable connectors.

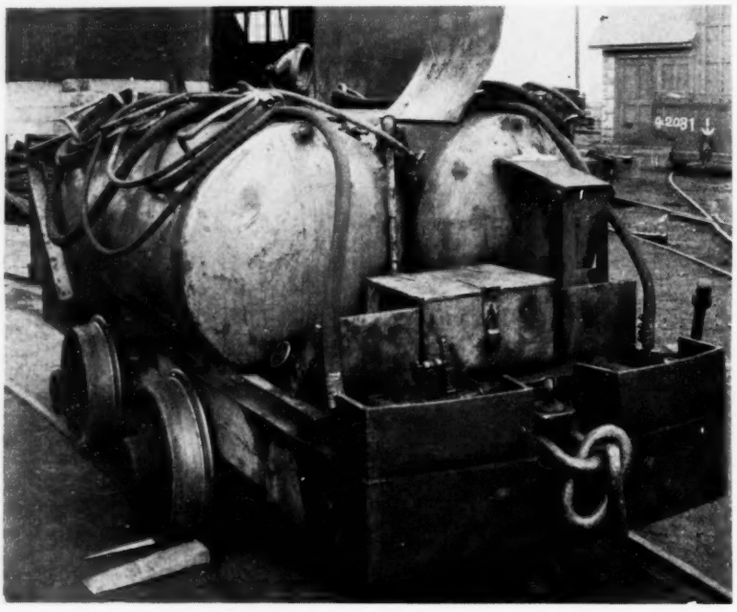


Compressor and Drive

At the outlet from each tank is installed a Niagara oil meter, which facilitates the keeping of individual lubrication records for each machine. Lubricants are fed from the tanks through 30-ft. lengths of ¾-in. air hose.

Super-pressure greasing of the Alemite fittings on the loading machines is effected through an Alemite "lubri-gun" which is installed between the two tanks. This gun is fed from the heavy-lubricant tank, from which also it receives its air supply, the connection being such that the lubricant is first measured before passing into the gun. As the gun has a pressure ratio of 1 to 13, it delivers the lubricant at a discharge pressure of 1,300 lb. With this machine, two men will oil and grease a loader in 20 to 30 min.

Discharge End of Lubricator



Permanent Value Found in Temporary Slate Dump

A movable slate dump built as a temporary device by the Coal Run Coal Co. at Cunard, W. Va., has dumped 25,000 two-ton cars of slate since it was built two years ago. It is of simple design and built of wood, but has served very well as a means of dumping refuse parallel to a short section of track along the side of the ravine.

Fig. 1 shows a car of rock being tipped during the process of dumping. An electric room hoist that had seen service in a mine is utilized to raise one side of the dump and thus tip the car to the unloading position.

Referring to Fig. 2, the dump com-

Fig. 1—Dumping a Car of Slate

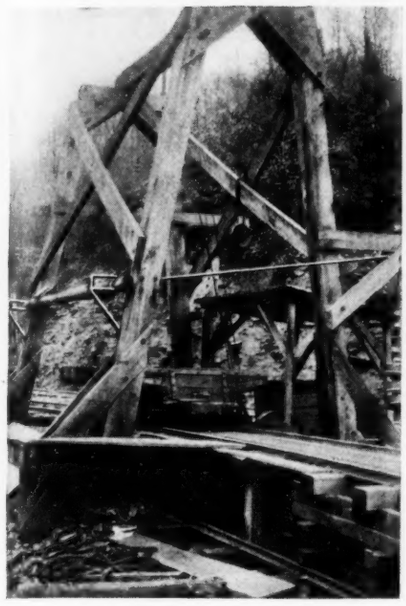


Fig. 2—Empty Car Back in Normal Position

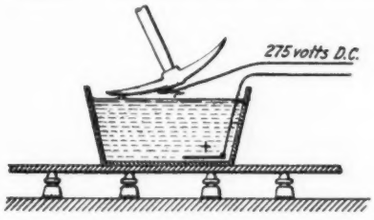
plete with hoist and tower for supporting the rope sheave is mounted on mine-car trucks so that it can be moved easily as the lower track is extended. The pole, mounted in slotted guides on the left-hand side of the tower, acts as a stop to limit the tipping of the car and as a pusher to force the car back over dead center so that it can be lowered by use of the hoist brake. Car-wheel counterweights, seen at the extreme right of the illustration, bring the pole back to normal position.

Construction of the dump hinge, or pivot, is shown in Fig. 3. The dump rails are mounted on five 6x8-in. ties which are set on edge and are pivoted at one end to four stationary ties of the same size that are mounted flatwise between them. Washers on the pivot rod between the stationary and movable ties maintain proper spacing so that there will be no interference between ties as the dump settles to level position.

The car track through the dump is maintained on a uniform grade so that the cars will travel by gravity; therefore it is necessary to excavate space for the lower track as the dump is moved forward. Providing sheet metal chutes for the refuse to slide over extends the moving interval to several months.

Picks Heated in Mine by Arc to Salt Water

At shaft mines, no doubt much of the blacksmith work, such as sharpening tools, would be done inside the mine but for the smoke and noxious fumes made by a fuel-consuming forge or heater. At a shaft mine in a bituminous district, all hand picks are sharpened in a tool room near the shaft bottom. Heating is by electric arc with the pick itself as one electrode.



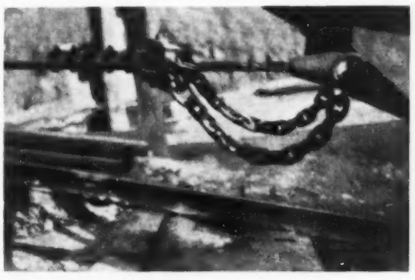
Heats the Point Before the Body Gets Hot

The arrangement is indicated in the accompanying sketch. The positive electrode lies in the bottom of a wooden tub which is insulated from the mine bottom. The tub is filled with water, and salt is added to raise the conductivity. Connection to the negative line is made by resting the pick on a bar of metal arranged in a fixed position above the water. The operative holds to the end of the wooden handle of the pick, tips the head to make contact with the salt water, and then back just far enough to maintain an arc.

Two to three inches from the point is the preferred location for the arc. Sufficient heat travels to the point, and shaping on the anvil is done before the center of the pick becomes hot enough to injure the handle. The insulated platform supporting the tub should extend sufficient distance beyond the tub to assure that the blacksmith must stand thereon when holding the pick in contact with the electrodes. This platform and the wooden handle of the pick provide two points of insulation to protect the men from shock. Obviously this open-arc method of heating should be practiced only in mines and locations where arc welding is permitted.

Appreciable Slack Not Good In Safety Chains

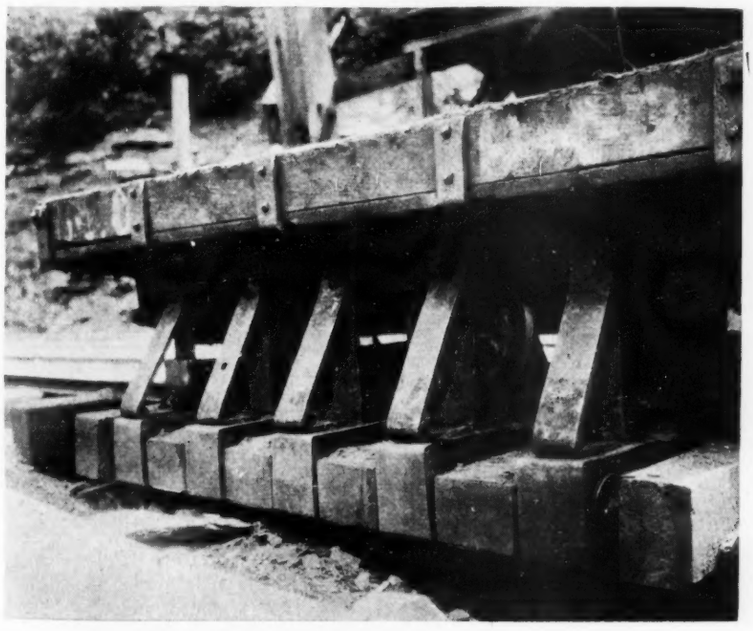
No better method than the zinc-filled socket is available for attaching a wire rope. It has the disadvantage, however, that a casual visible inspection will not disclose faulty work. For this reason, and also because vibration or twisting may cause deterioration adjacent to the socket, it is the usual practice on mine cages and incline cars to have a second attachment by chains or ropes to a clamp located a few feet from the socket on the main rope. But to provide real assurance of safer operation, the short auxiliary chains or ropes should be arranged with a minimum amount of slack.



These Chains Are Too Loose

The illustration shows this common fault of excessive slack in safety chains. Failure of the rope attachment at the socket would temporarily release the car, with the result that the shock of take-up by the safety chains might cause a second failure of the rope or attachments.

Fig. 3—Dump Ties Hinged to Stationary Ties



WORD from the FIELD

Rate Increase Opposed

Coal producers, retailers, and exporters joined hands in opposing the proposed 15 per cent increase in freight rates before the Interstate Commerce Commission on Sept. 26. The National Retail Coal Merchants' Association, Coal Exporters' Association, Ohio Lake Cargo Coal Rate Committee, Western Pennsylvania Coal Traffic Committee, and dock and dealer interests in the Northwest came out against the increase in arguments presented before the commission at the hearings in Washington, D. C. The increasing inroads of substitutes and foreign competition were pointed out as trends which would be aided by any increase in rates. Legal phases of the carriers' petition were dealt with by J. Van Norman, representing producers in West Virginia, Kentucky, Virginia, and Tennessee, in an argument on Sept. 23.

Williamson Boosts Coal

The Operators' Association of the Williamson Field, with the active assistance of the Sycamore Coal Co., cooperated in the conduct of a heating show in Williamson, W. Va., early in September, put on to educate the public in the savings resulting from the use of coal over natural gas. Seven booths with stoker exhibits arranged by local representatives of the equipment companies comprised the show, and results were immediately forthcoming in sales of machines in Williamson and surrounding towns.

Illinois Institute Meeting

The annual fall business and technical meeting of the Illinois Mining Institute will be held at Springfield, Ill., Nov. 6. Ventilation, coal cleaning, and mine pumping will be among the subjects of papers at the technical sessions. Speakers so far scheduled and their papers are as follows: "Combustion—Cleaning of Coal," Prof. E. D. Snow, University of Illinois, Urbana, with discussion led by A. E. Grunert, Commonwealth Edison Co., Chicago; "Fan Equipment—Ventilation and Its Relation to Power Consumption," L. R. Robinson, Robinson Ventilating Co., Zelienople, Pa., discussion to be led by Raymond Mancha, Mancha Storage Battery Locomotive Co., St. Louis, Mo.; "Mine Pumping, Automatic Controls, Float Switches, Automatic Suction Valves," J. M. Johnston, chief engineer, Bell & Zoller Coal & Mining Co., Zeigler, Ill.

Dull Days Ahead for Business

"The last quarter opens without significant sign of autumn acceleration or promising prospect of early improvement in the business picture in any other essential respect," says *The Business Week* of Oct. 7. "It is becoming clearer that the shock to the world's financial nervous system and the disturbance of its international trade metabolism due to the abandonment of the gold standard by a large part of it will require emergency treatment and a prolonged period of convalescence. So far, the American securities markets have withstood the shock with surprising strength, assisted by a drastic ligature of limitations on short-selling, but how far they will be able to stand the steady pressure of world-wide credit liquidation and the accompanying gold hemorrhage remains to be seen.

"Fortunately, the Federal Reserve is freely offering its blood transfusions of credit to maintain easy money conditions in this market in face of emergency foreign and domestic demands. Meanwhile, current indicators give no evidence that business is going to break through the rock-bottom resistance level which bare replacement demands have established since last December, in spite of pressure of accumulating credit difficulties and disappointing performance in security and commodity markets. Our index still holds above the 70 per cent line, despite persistent weakness in most components, and there is some reassurance in the superseasonal strength of building projects. But the days pass swiftly."

New Plant Construction

New contracts for topworks and construction under way or completed at various coal operations in September are as follows:

Barnes Coal Co., Barnesboro, Pa.; contract closed with Roberts & Schaefer Co. for all-steel, two-track, Marcus tipple, equipped with car feeders, cagers, revolving dumps, Marcus picking table-screen, and rock-disposal machinery; capacity, 500 tons per hour; to be completed, Nov. 15.

Davis Coal & Coke Co., Thomas, W. Va.; contract closed with Roberts & Schaefer Co. for all-steel, two-track, Marcus tipple, equipped with Marcus picking table-screen, loading booms, fine-coal preparation plant, local trade facilities, and rock-disposal machinery; sizes to be produced, lump, nut, pea, and slack; capacity, 150 tons per hour: to be completed, Dec. 15.

Green River Fuel Co., Mogg, Ky.; contract closed with the Hydrotator Co. for the installation of an air-sand coal-cleaning plant to handle 2x$\frac{1}{8}$-in. coal at the rate of 100 tons per hour. Special equipment is being provided to dedust the stoker coal and market it free of $\frac{1}{8}$-in. fines. The plant is to be completed about Nov. 1.

Susquehanna Collieries Co., William Penn Colliery, Shenandoah, Pa.; Hydrotator Co. has installed Hydrotator coal-cleaning equipment for preparing 15 tons per hour of No. 3 buckwheat.

Yukon Pocahontas Coal Co., Yukon, W. Va.; contract closed with Roberts & Schaefer Co. for Menzies hydroseparator coal-washing and sizing plant for washing 3x0-in. slack coal and separating it into slack, pea, nut, and stove; capacity, 300 tons per hour; to be completed, Nov. 1.

Transportation Code Issued

A set of standards for the installation and operation of coal-mine transportation equipment has been approved by the council of the American Standards Association as the "American recommended practice safety code for coal-mine transportation." The code deals specifically with tracks, clearances, signals, doors, slope hoists, shaft hoists, and cars. Both installation and operation are covered.

Wage Cut Approved by West Virginia Miners; Glen Alden Mines Closed by Strike

MEMBERS of the United Mine Workers and the northern West Virginia operators whose mines are working under closed-shop contracts agreed on a wage reduction of 25 per cent at a conference in Fairmont, W. Va., Oct. 2. Authority to negotiate for the lower scale of payments was voted by the miners at a convention in the same city on Sept. 28. The announced purpose of the reduction, the miners declared, is to "allow union mines to operate and place their coal on the market in competition with the non-union operators who are responsible for this vicious, cut-throat competition." The old scale provided for the following wage rates: loading on machine sections, 30c. per ton; loading on pick-mining sections, 38c. per ton; cutting, 5c. per ton; motormen, helpers, trackmen, and timbermen, $3.60 per day; other inside labor, $3.20 per day; tipplemen, car repairmen, lampmen, other outside labor, $3.60 per day; picking labor, $2.40 per day.

To compensate to some extent for the losses in earnings, the operators agreed to reduce house rentals, doctors' fees, and lamp charges 25 per cent, and to eliminate entirely blacksmithing charges, said to amount to ½c. per ton. Signs that the reduction was not universally popular with the men became apparent in the early days of October. Dissatisfaction was most apparent in the Scotts Run region, where four partial strikes were reported. Delegates from this field were among the leaders in opposing the reduction at the miners' conference.

Union adherents concentrated their efforts in Monongalia County in September in an effort to prevent the resumption of non-union mining, with the result that a number of clashes occurred early in the month. A fight on Sept. 10 between strikers and state police at the Riverseam Coal Co. mine, Booth, resulted in serious injuries to two of the police, and a number of arrests. Seven non-union men were injured in a fight at the mine of the Byrne Gas Coal Co., Paisley, on Sept. 11, and eighteen of their attackers were lodged in jail. That night, snipers armed with rifles and guards manning machine guns staged a pitched battle at the Connellsville By-Product Coal Co. mine, Pursglove, W. Va. A mine guard was slightly injured by a spent bullet.

Miners and operators in Appanoose County, Iowa, signed a temporary wage and working agreement on Sept. 18, marking the first return to closed-shop conditions since the expiration of the Jacksonville agreement. Union recognition, the check-off, checkweighmen, and mine committees were included in the contract, which will be binding on 66 coal companies and 2,500 men. The 1917 wage scale (day work, $4.96; pick mining, $1.48 per ton) is to prevail until a permanent competitive scale can be agreed upon in future negotiations.

Ratification in the last days of September of a new wage agreement containing provisions for pay reductions varying from 10 to 15.6 per cent marked the end of a stoppage in the Saginaw Valley field of Michigan, which began on April 1 and affected about 1,000 men. A protective clause in the new contract gives either the operators or the miners, after March 2, 1931, the right to reopen the wage question if working conditions or wages change in other fields.

A wage reduction of 25 per cent posted by the Western Coal & Mining Co. at its Lexington (Mo.) mines, and differences between the miners and the operators over the wage scale to be included in the next contract in District 25, United Mine Workers, resulted in several demonstrations in Lexington in September. The operators, it is reported, request that the $6 scale be reduced to $3.25, while the miners are said to have voted to boycott the mines unless the old scale is retained.

Union men employed at the anthracite mines of the Glen Alden Coal Co. revolted against their district leaders and declared the second outlaw strike of the year on Sept. 24. By Sept. 29, it was estimated that approximately 25,000 men were idle in Lackawanna and Luzerne counties, leaving only three of the 26 collieries and mines still in operation. The strikers demanded equalization of working time, elimination of alleged abuses in working conditions, and the resignation of John Boylan, Scranton, president of District 1, United Mine Workers.

Representatives of both the regular and insurgent factions appealed to Governor Pinchot of Pennsylvania for assistance. The regular faction, under the leadership of Thomas Kennedy, international secretary-treasurer, visited the Governor on Sept. 29 and requested him to guarantee that the men who wished to go back to work could do so without fear of molestation by the strikers. The Governor replied that all the power of his office would be employed to see that the men had "the choice of working where and under what conditions they will." The insurgents paid a call on the Governor on Oct. 1, and reported after the conference that he had agreed that strikers could picket freely so long as they did not interfere with the men going to work.

The month in Ohio brought about the settlement of a strike at the Sunday Creek Coal Co. mines and a wage reduction at the Hanna Coal Co. mines in eastern Ohio. The Sunday Creek strike, called on Sept. 22, was the result of a controversy over the naming of a checkweighman at the No. 5 mine, Murray City. Employees at the No. 10 mine of the Western Fuel Co., Nelsonville, joined in the movement, which rapidly spread to six other mines in the district. The men insisted that the companies accept the checkweighmen who were appointed by the United Mine Workers, and thus brought in indirectly the question of union recognition.

The walkout was finally settled through the intervention of Governor White. According to the Governor's plan of settlement, only miners actually employed at the mine will be allowed to vote in the selection of a checkweighman for that operation. Two National Guard officers and James Berry, chief of the Department of Mines and Mining, were named to see that the elections, to be conducted under the provisions of a new state law effective Sept. 27, were carried on fairly. While the miners accepted the proposals of the Governor, they announced that the compromise would not halt attempts to gain union recognition.

The Hanna Coal Co. reduced the scale of wages paid at five of its mines in Jefferson and Belmont counties 14 per cent on Oct. 1. The basic rate of pay was cut from $5 to $4.30 per day, affecting 1,800 miners. Economic conditions and the wage scales of competitors in the field, which was the scene of bitter fighting earlier in the year, were assigned as the reasons for the reduction by the Hanna company. The checkweighman question also arose at the Syracuse (Ohio) mine of Syracuse Mining, Inc., and at the Pomeroy mine of the Stalter & Essex Mining Co. in September. The walkout was satisfactorily settled after a few days, however.

The Colorado situation was featured by the continued opposition of the State Industrial Commission to the wage-cutting plans of the operators. The commission published a number of findings condemning reductions, and early in the month (Sept. 3) suggested the organization of the miners as a means of protecting their rights. Differences over the question of prosecuting companies for intimidation of their work-

United Electric Coal Cos. Not in Receivership

The United Electric Coal Cos., operating the Fidelity and Freeburg strip mines in Illinois, are not, as was erroneously reported in the preceding issue (p. 505), in receivership. Neither are the bonds of the company in default as to interest or sinking fund payments. As a matter of fact, the company and its subsidiaries reported net earnings, after taxes, depreciation, depletion, interest, and other charges had been deducted, of $150,562 for the year ended July 31, 1931, equal, after preferred dividends, to 48c. per share on the common stock. *Coal Age* greatly regrets the publication of the erroneous report as to the status of this company in its September issue, and takes this means of correcting any wrong impressions which may have arisen.

ers where they had agreed to reductions without the formal 30 days' notice split the commission on Sept. 10. On that date, William H. Young declared that the operators should answer for the methods used in obtaining signatures. The other two members stuck to their previous pronouncement that the companies probably were justified in the action by the precedent set by previous commissions. They ruled, however, that all future reductions must await the regulation 30 days regardless of the assent of the workers.

Two miners were killed, two were gravely injured, one girl was seriously wounded, and twelve mounted policemen were hurt in a battle at Estevan, Saskatchewan, Canada, Sept. 29, climaxing three weeks of differences between the coal companies in the field and their employees. About 400 miners went out in the initial strike on Sept. 8, and eight non-union mines were closed down. Reasons for the strike were given as dissatisfaction with the company stores, housing arrangements, and wages paid. The advent of trouble resulted in 21 small companies abandoning their agreement with the union. Their mines were promptly closed by walkouts, together with most of the remaining non-union operations, leaving the Truax-Traer Coal Co., Ltd., strip mine as the only one of any importance still running.

Full approval of both the economic and legislative plans of the United Mine Workers for the stabilization of the bituminous coal industry was contained in the report of the executive council of the American Federation of Labor to the fifty-first annual convention at Vancouver, British Columbia, Oct. 5. The council discounted the contention of opponents to the United Mine Workers' bill for the creation of a Federal Coal Commission that the industry was rapidly putting its house in order and gave its support to the plans of the miners' union to press for passage of the bill at the forthcoming session of Congress. The bill in question, which has twice been introduced in Congress by Senator Watson, guarantees free speech and assembly, and affirms the right of employees to affiliate with a trade union.

Coming Meetings

National Safety Council; annual meeting, Oct. 12-16, Stevens Hotel, Chicago.

Illinois Mining Institute; annual fall meeting. Nov. 6, Springfield, Ill.

International Conference on Bituminous Coal; Nov. 16-21, Pittsburgh, Pa.

Indiana Coal Operators' Association, annual meeting, Nov. 17, Terre Haute House, Terre Haute, Ind.

Southern Appalachian Coal Operators' Association; annual meeting, Nov. 20, Knoxville, Tenn.

Harlan County Coal Operators' Association; annual meeting, Nov. 18, Harlan, Ky.

Canadian Institute of Mining and Metallurgy; western meeting, Nov. 25-27, Vancouver, B. C.

Walter H. Cunningham

Formerly chairman of the executive committee of the Truax-Traer Coal Co., has been appointed executive vice-president of the Binkley Coal Co., Chicago

District Selling Agencies Urged By J. D. Francis

Modification of the anti-trust laws is not an essential prerequisite to cooperation between coal producers, was the opinion expressed by James D. Francis, vice-president, Island Creek Coal Co., Huntington, W. Va., in addressing the Sept. 16 session of the mineral law section of the American Bar Association, which held its annual meeting at Atlantic City, N. J., the week of Sept. 14. Mr. Francis, who strongly advocated the formation of district selling agencies, was one of the several speakers at the lengthy session on liberalization of the anti-trust laws.

Owners and producers are more anxious to place their industry on a sound and profitable basis than any other class, he declared, but the greatest problem yet remaining is to convince the individual operator "that as an individual he can improve his own situation by a rational cooperation with his competitors." Any change in the anti-trust laws, however, would remove the excuse most generally employed to justify a refusal to join in measures for mutual assistance. "Nevertheless, had we no anti-trust laws, we would still have the difficulty of producers refusing to act in their own interest in cooperation with their neighbors."

In view of the fact that competition probably is keenest between producers in the same district, and that the "greatest evil" in the industry today is the great excess of selling and distributing companies over producing units, Mr. Francis was of the opinion that "one of the most effective remedies would be mergers of producing companies which would sell their own coal." Combinations large enough to be effective are difficult to form, however, and many believe that the expected benefits would not be realized. "On the other hand, there is no valid reason why producers cannot employ a single sales agency to sell the output of a large producing area."

Price-fixing or restriction of production on the theory that coal can have a monopoly of the heat and power market would ultimately be destructive of the industry itself by increasing fuel economy and encouraging the use of substitutes, Mr. Francis declared, and the sales agency should not be used as a cloak for such practices. On the contrary, these agencies can promote and develop the use of bituminous coal, properly advertise its advantages over substitute fuels, eliminate price competition, and raise the general level of prices to the consumer without creating a monopoly. Thus the user would be guaranteed a stable market in which he would have to pay no more than his competitor, and the producer would be able to better regulate working time and employment.

Coal would be sold under the trade-mark of the producer or producers, who would receive the actual amount paid by the consumer less the average cost of selling and distributing. The producers of the better grades of coal would retain all the advantages of both better conditions and more efficient management, plus the further assistance of a stronger sales organization. The proposed agencies also would be a better position to collect adequate information on competitive conditions created by other coals or substitute fuels, and thus eliminate selling at low prices under the fear that business would get away.

At the closing session on Sept. 18, the association voted unqualified approval of the recommendation of its commerce committee that combinations in restraint of trade, within limits, be permitted by law. The amendment proposed would confer on the Federal Trade Commission the power to pass in advance on contracts in restraint of trade, voluntarily submitted for consideration. In approving such contracts, the commission would have the power to grant immunity from the criminal, confiscatory, and three-fold damage provisions of the anti-trust laws.

Breaker Contract Awarded

The contract for the design and construction of the new anthracite breaker of the West End Coal Co., Mocanaqua, Pa., has been awarded to Stuart, James & Cooke, Inc., New York City. The new plant, which will have a capacity of 2,000 tons per day, will be equipped with Chance cones for cleaning purposes.

Indiana Rescue Station Opened

A mine rescue station, the first to be operated by the State of Indiana, was opened at Terre Haute Oct. 1, with Michael Ferguson as superintendent. Mr. Ferguson will work under the direction of Albert C. Dally, chief mine inspector for the state.

Southern Appalachian Operators Make Safety Record

Only twenty minor injuries among the 10,000 men employed, resulting in the loss of 540 man-days, was the record hung up by members of the Southern Appalachian Coal Operators' Association at the end of a no-accident campaign in the month of August. The same number of injuries were suffered by employees in August, 1930, but the loss in man-days was 12,368, more than twenty times the total in August of this year. Coincident with the reduction in man-days lost, the tonnage per accident was increased from 15,293 in August, 1930, to 17,122 in August, 1931.

Executives and miners all signed pledges to the effect that they would cooperate in the August campaign and work carefully during the month. Flags were raised at each mine on the last day of July to remain flying until there was an accident. Twenty-one were still in the air at the end of August, and will be replaced by permanent banners. The August record brought the total number of man-days lost through accidents up to 92,345 for the twelve months' period, against 249,464 in the preceding year. Tons mined per accident showed an increase of 13.5 per cent in the past year, as compared with the preceding one.

The August compaign was conducted by a safety committee composed of J. E. Butler, general manager, Stearns Coal & Lumber Co., Stearns, Ky.; J. B. Gatliff, president, Gatliff Coal Co., Williamsburg, Ky.; and C. A. Griffith, vice-president, Pruden Coal & Coke Co., Pruden, Tenn.

Southwest Coal Men Participate In Power Conference

The mining, preparation, and distribution of coal formed one of the major topics at the Southwest Power Conference, held in Kansas City, Kan., Sept. 7-11. Through the efforts of the Southwestern Interstate Coal Operators' Association and the Midwest Retail Coal Merchants' Association, two sessions on Sept. 9 and 10 were given over to these subjects, while the operators' association and the Kansas City Coal Institute sponsored two booths at the Southwest Power and Mechanical Exposition, held in conjunction with the power conference. Coal exhibits and illustrations of mining, preparation, economical combustion, and other features of the coal trade were employed to tell the story of the industry to the visiting delegates.

"Improvements in Mining and Preparing Strip Coal in the Southwest" were detailed by L. Russell Kelce, vice-president, Hume-Sinclair Coal Mining Co., Kansas City. Mr. Kelce pointed out that the production of strip coal had increased in the Southwest in spite of a decrease in consumption brought on by fuel economies and the inroads of other fuels. Discussion brought out the fact that careful mining and preparation had increased the heat values of strip-mined coal from 9,800 to 10,500 B.t.u. per pound, and that natural gas at 15c. per M and oil at $1 a barrel had taken away from Southwest producers business estimated at approximately 1,000,000 tons per year.

"Coal, the Basic Fuel," was the subject of Henry Kreisinger, consulting engineer, International Combustion Engineering Corporation, New York City. Original quantity, reduction by mining, present net reserves, and the distribution of coal among the states were among the topics covered by Mr. Kreisinger, who also offered analyses of coal, oil, and natural gas, as well as the analyses and weights of the products of combustion, the heat balance, and the consumption of gas oil and fuel oil by the various classes of consumers from 1926 to 1928, inclusive.

A plea for greater cooperation among individual coal producers was made by C. B. Huntress, executive secretary, National Coal Association. Mr. Huntress pointed out the losses due to increased fuel economy, but observed that a minimum would some time be reached. Also, he declared, other sources of power cannot continue indefinitely encroaching on the field of bituminous coal.

Permissible Plates Issued

Eleven approvals of permissible equipment were issued by the U. S. Bureau of Mines in July and August, as follows:

(1) Goodman Mfg. Co.; Type 148-K3 power shovel; 35-hp. motor, 440 volts, a.c.; Approval 222A; July 28.

(2) Chicago Pneumatic Tool Co.; No. 574 post drill; 3½-hp. motor, 220-440 volts, a.c.; Approvals 225 and 225A; July 10.

(3) Crawford Machinery Co.; dragline conveyor; 5-hp. motor, 230 volts, d.c.; Approval 226; July 27.

(4) Chicago Pneumatic Tool Co.; No. 572 drill; 1½-hp. motor, 110-250 volts, d.c.; Approval 227; July 29.

(5) Jeffrey Mfg. Co.; Type A-6-A post drill; 2-hp. motor, 250 volts, d.c.; Approval 228; Aug. 12.

(6) Goodman Mfg. Co.; Type 48K3 power shovel; 60-hp. motor, 220-440 volts, a.c.; Approvals 229 and 229A; Aug. 17.

(7) Jeffrey Mfg. Co.; Type A-6 post drill; 1½-hp. motor, 220-440 volts; Approvals 230 and 230A; Aug. 20.

(8) Jeffrey Mfg. Co.; Type 29-L arcwall mining machine; 50-hp. motor, 250-500 volts, d.c.; Approvals 231 and 231A; Aug. 31.

(9) Edison Storage Battery Co.; Edison, Model K cap lamp; Approval 25; Aug. 19.

(10) Concordia Electric Co.; Concordia, Type L-18, semi-portable, pneumatic-electric lamp; Approval 1007; Aug. 19.

(11) Mine Safety Appliances Co.; M.S.A., Model H. single-shot blasting unit (Edison, Model H cap lamp with blasting attachment); Approval 1208; Aug. 17.

The following cables were added to the list of "Specially Recommended Cables" during July, 1931:

BM-12. "Okocord" No. 3 twin cable (19x7 stranding).

BM-13. "Okocord" No. 4 twin cable (19x7 stranding).

Preparation One of the Subjects At World Coal Conference

Seven speakers from the United States and foreign countries will discuss the preparation of coal at the Third International Conference on Bituminous Coal, to be held at the Carnegie Institute of Technology, Pittsburgh, Pa., Nov. 16-21. The authors and their subjects are as follows: "Interpretation of Float-and-Sink Data," Byron M. Bird, Battelle Memorial Institute, Columbus, Ohio; "The Air-Sand Process of Coal Cleaning," Thomas Fraser, Hydrotator Co., Pittsburgh, Pa.; "Value of Clean Coal for Steam Production," E. B. Ricketts, research engineer, New York Edison Co., New York City; "Methods of Coal Cleaning with Particular Reference to Fine Coal," C. Berthelot, France; "Coal Cleaning Practice in Great Britain," Prof. W. R. Chapman, England; "Laboratory Experiments on Magnetic Coal Dressing," Prof. Dr. B. Granigg, Austria; "Preparation of Coal from a Petrographic Point of View," Dr. Karl Lehman, Germany.

Competition between coal and other fuels will be the subject of four papers. R. B. Harper will discuss "Competition Between Natural Gas and Coal," while Dr. W. T. Thom, Jr., will talk on the "Interrelationships of Coal, Petroleum, and Natural Gas." Natural gas also will be the subject of a paper by a representative of Ford, Bacon & Davis, natural gas engineers and pipe-line builders. "Economics of Waterpower vs. Steam Power," will be the theme of G. A. Orrok.

Combustion of domestic sizes of coal will be dealt with in a paper on "Studies of Small Stokers for Bituminous Coal," by G. A. Young and W. T. Miller. Among the papers on railway and steamship fuel problems are the following: "Pulverized Coal for Locomotives," J. C. Chapple; "Use of Coal on Shipboard," C. J. Jefferson and R. D. Gatewood; "Dynamometer and Road Results With Stug Pulverized Fuel Fired Locomotive," Richard Roosen, Germany; "European Progress in the Use of Powdered Coal in Steamships," Ch. M. Stein, France; "Future Use of Coal as Locomotive Fuel," F. M. Waring; "Railway Fuel," H. C. Woodbridge and associates.

Other subjects scheduled for consideration at the conference cover hydrogenation and liquefaction, byproducts, high- and low-temperature carbonization, gasification, gas and coal combustion, smoke and ash abatement, origin and classification of coal, economics, metallurgy, and stream pollution.

New River Buys Breakers

The New River Co., Macdonald, W. Va., has placed an order with the Automatic Reclosing Circuit Breaker Co. for complete sectionalizing equipment for the Oakwood mine, Carlisle, W. Va. Twelve breakers are included in the material to be furnished.

Williamson Institute Formed

Final organization of the Mine Safety Institute of the Williamson Field was completed at a meeting in Williamson, W. Va., Sept. 29, which was attended by representatives of 75 per cent of the tonnage mined in the field. Officers were elected for the ensuing year as follows: president—J. T. Morris, general manager, Bordeland Coal Corporation, Borderland, W. Va.,; vice-presidents—C. A. Hamill, assistant general manager, Sycamore Coal Co., Cinderella, W. Va.; Geo. B. Baker, general manager, Tierney Mining Co., Stone, Ky.; William Currie, superintendent, Leckie Collieries, Aflex, Ky.; secretary-treasurer, Joseph J. Ardigo, secretary, Operators' Association of the Williamson Field, Williamson.

The executive committee is composed of the following: H. L. Eaton, superintendent, Red Jacket Consolidated Coal & Coke Co., Red Jacket, W. Va.; Wm. A. Eads, safety director, Fordson Coal Co., Stone; W. E. Davis, superintendent, Howard Collieries, Chattaroy, W. Va.; L. W. Helmintoller, general manager, Allburn Coal Corporation, McCarr, Ky.; Frank Crum, superintendent, Puritan Coal Corporation, Puritan Mines, W. Va.; and Joseph D. Lawrence, manager, Appalachian Electric Power Co., Williamson.

Coal Developments Started

The Coal Stripping Co., Pinckneyville, Ill., is completing construction work in preparation for the development of an additional acreage of strip coal adjacent to the Pyramid operation. An 8-yd. Bucyrus electric shovel will be used in removing the overburden, and coal will be loaded by a 2-yd. shovel of the same type. New preparation facilities include a 54-in. raw coal belt from the dump hopper, shaker screens, crushing and mixing equipment, and facilities for loading on four tracks. The engineering work is being done by the Allen & Garcia Co., Chicago.

The Allen & Garcia Co. also has been commissioned to prepare plans for the rehabilitation of the Springhill (Nova Scotia) surface plant of the Dominion Steel & Coal Corporation. Coal will be hoisted through two slopes and handled through a single preparation plant. No date has yet been set for starting construction.

Elkhorn Piney Wins Contest

The Beards Fork team of the Elkhorn Piney Coal Mining Co. took first place in the first-aid events featuring the third annual safety meet of the Kanawha Valley Mining Institute, held Sept. 19, at Montgomery, W. Va. Second place went to Team No. 2 of the Carbon Fuel Co., while third honors were captured by the Kingston No. 2 team of the Kingston Pocahontas Coal Co. First place among the colored entrants went to the Page team of the Loup Creek Colliery Co.

Explosives Approved

Three additions to the active list of permissible explosives were made by the U. S. Bureau of Mines in September, as follows:

(1) Atlas Powder Co., Coalite D, L. F.; volume of poisonous gases less than 53 liters; characteristic ingredient, ammonium nitrate with explosive sensitizer; weight of 1¼x8-in. cartridge, 154 grams; smallest permissible diameter, ⅞ in.; unit deflective charge, 214 grams, rate of detonation of 1¼-in. diameter cartridge, 12,070 ft. per sec.

(2) Peerless-Union Explosives Corporation, Peerless D; volume of poisonous gases, less than 53 liters; characteristic ingredient, ammonium nitrate with explosive sensitizer; weight of 1¼x8-in. cartridge, 164 grams; smallest permissible diameter, ⅞ in.; unit deflective charge, 212 grams; rate of detonation of 1¼-in. diameter cartridge, 8,400 ft. per sec.

(3) Burton Explosives, Inc., Permigel 1, L. F.; volume of poisonous gases, less than 53 liters; characteristic ingredient, nitroglycerin gelatinized with nitrocotton; weight of 1¼x8-in. cartridge, 238 grams; smallest permissible diameter, 1 in.; unit deflective charge, 255 grams; rate of detonation of 1¼-in. diameter cartridge, 13,840 ft. per sec.

Canada Exempts Anthracite

Anthracite coal imported into Canada from all countries is exempted from dumping duty under new appraisers' regulations issued Sept. 30, 1931. Dumping duty applies only to goods of a class or kind made or produced in Canada, when the selling price to the Canadian customer is less than the fair market value of the product as sold for home consumption in the country of export. Anthracite coal has been ruled to be of a class or kind not produced in Canada.

DeBardeleben Safety Record

All operations of the DeBardeleben Coal Corporation, Birmingham, Ala., went through the month of August without a single lost-time accident, and continued safe working up until Sept. 19, except for one injury involving the loss of four days. In August, the mines worked 169,954 man-hours. Negro employees at the Empire mine have worked from Oct. 8, 1929, to Sept. 17, 1931, the date of the last statement, without a single lost-time accident. An average of 103 men were employed throughout the period.

John B. Newton Dies

John Brockenbrough Newton, president of the Virginia Iron, Coal & Coke Co., died Sept. 22 at the Lewis-Gale Hospital, Roanoke, Va., where he had been a patient for about six weeks. Mr. Newton, who was 63, entered the employ of the Virginia company nearly 30 years ago, after some preliminary experience in the engineering profession and a term as a railroad president.

Butte Gas Line Completed

The final section of the natural gas line between the Cut Bank field of Montana and the cities of Butte and Anaconda was welded in on Sept. 19, marking the completion of 199 miles of 20-in., 16 miles of 16-in., and 8 miles of 12-in. line. Half of the main line was already in service when it was completed, and it was expected that gas would reach Butte late in the month. A total of 142,000,000 cu.ft. of gas per day is said to be already on tap in the Cut Bank field.

Work on the 20-in. natural gas line from Muncie, Ind., to the Panhandle Eastern Pipeline Co. mains at the Illinois-Indiana state line was well under way in September. It is reported that an extension from the Muncie line will be made to Indianapolis if conditions can be arranged for supplying the city with Texas natural gas.

New Stoker Developed

A new automatic stoker for use with either coking or non-coking bituminous coal and equipped with an ash remover and three heat controls will be put on the market in a few weeks by Combustioneer, Inc. The machine is designed for use in a six- or seven-room house, and has a maximum capacity of 30 lb. an hour. The cost, installed, is said to be less than $300.

Mather Wins Safety Meet

Thirty-two teams entered the First Annual Greene County First Aid Contest, held before 5,500 persons at Carmichaels, Pa., Sept. 26. First prize, donated by the National Coal Association, was won by Team No. 51 of the Mather Collieries, Mather, Pa., with a score of 100 per cent.

Wire Rope Research

In its attempts to develop an accurate and satisfactory method of determining the service life of wire rope, the Special Research Committee on Wire Rope of the American Society of Mechanical Engineers is approaching the problem from the standpoint that there is a definite relation between the wear and number of broken wires and the remaining useful life of the rope. The committee has consequently decided upon the collection of as much service data on wear and broken wires as possible, and has prepared a service data sheet for obtaining this information. To relate the data on each rope to its strength, arrangements have been made with the National Bureau of Standards, Washington, D. C., for the conduct of laboratory tests on sample sections of discarded rope, and the committee urges all interested persons to submit such samples to the Standards Bureau so that the results may be correlated with the service data obtained.

Government Regulation of Coal Discounted; Stabilization Plans Proposed

BUSINESS men and state officials continue to study various measures for the stabilization of bituminous coal, while Secretary of Labor Doak and Secretary of Commerce Lamont admit to inquirers that little opportunity exists for government regulation. Both secretaries are of the opinion that Congress has no authority to regulate the industry. Secretary Doak doubts that it could be persuaded to lift the present statutory prohibition against restriction of production by agreement. Industry must solve its own problems without government aid or dictation. Secretary Lamont advocates "cooperation" among the operators to control production, and suggests the possibility of legislation that would allow such control without infringing on the anti-trust laws.

Coordination of production and consumption is the central theme of all of the measures offered for stabilization, not only of coal but of business in general, the plans differing in general only in the method of achieving this coordination. Organization of all industrial and commercial companies with 50 or more employees into trade associations which, under the supervision of some federal body, would have general control of the policies and operation of the industries they represented was proposed by Gerard Swope, president of the General Electric Co., in an address on "Stabilization of Industry," given before the National Electrical Manufacturers' Association at New York City, Sept. 16. The associations would foster the collection and interchange of information, adoption of trade practices, codes of ethics, accounting systems, and earnings reports, stabilize prices, standardize products, and exercise a general control of all matters which might affect the growth or development of industry and commerce. Protection of the worker is one of Mr. Swope's major points, and it would be the duty of the trade associations to work for the adoption of the best possible compensation plan, life and disability insurance, old-age pensions, and unemployment insurance.

Appointment of a tribunal of federal representatives familiar with the technical and business problems of the natural-resource industries to determine overproduction and permit agreements for its control was recommended in the report of the natural resources production department committee on stabilization of the oil, coal, and lumber industries to the board of directors of the Chamber of Commerce of the United States, Oct. 3. C. E. Bockus, president of the National Coal Association, represents the bituminous industry on the committee. The text of the recommendation is as follows:

> We, therefore, recommend that—through legislative enactment, there be created a tribunal consisting of government officials familiar with the natural resources industries, who shall be authorized to find when overproduction on a scale injurious to the public interest exists, or is threatened in any of the products of the mines or forests; and upon such finding the producers shall be authorized, with the approval of the tribunal, to enter into an agreement to curtail to a reasonable extent the production of such products entering interstate commerce; such agreement to be entered into or terminated at the option of the industry, or upon the order of the tribunal when, in its judgment, the condition of injurious overproduction no longer exists.

Such an arrangement, the committee felt, would not result in the establishment of a large permanent federal commission, and it should not result in the loss of initiative within the industries, or lead to the development of practices which would be inimical to public interest. Nor would it preclude the development of the trade practice conference, or of trade association activities. Under this provision the industries would, of course, not be prevented from adopting any of the various measures suggested for their betterment that do not require legislative aid.

Old Problems—New Plans

Appointment of a federal tribunal to determine when the bituminous coal industry is overproducing and permit agreements between producers to halt mining in excess of demand is recommended by a stabilization committee of the Chamber of Commerce of the United States, and amendment of the anti-trust laws to allow coordination of output and demand in all industries is proposed by the chamber's business and employment committee. On the other hand, Secretaries Doak and Lamont believe that there is little that the federal government and Congress can or will do to help coal.

Minimum wage scales, a five-day week, and minimum prices not less than the cost of production are measures for the stabilization of coal offered by C. F. Hosford, Jr., president, Butler Consolidated Coal Co. Formation of new competitive fields to be governed by tribunals of operators are the solutions favored by Governor Pinchot of Pennsylvania and the sponsors of the "Wheeling plan." Governor Flem D. Sampson, Kentucky, has offered no plan, but is working for a conference of governors to develop measures for insuring a fair return to the operators and adequate earnings for the miners.

The latest news on these developments is given in the accompanying columns of Coal Age.

Amendment of the anti-trust laws to allow business concerns to enter into contracts for equalizing production and consumption was recommended by the chamber's committee on continuity of business and employment on Oct. 5, with the proviso that such contracts must be filed with some government authority. The government agency would have the right to abrogate any agreement after finding on its own initiative or complaint that the contract was not in the public interest. The committee also recommended that provision be made for allowing any businesses that desire to do so to combine to find out from some governmental authority before the combination is made whether or not the combination is prohibited by anti-trust laws.

Establishment of a minimum wage scale in each producing district, limitation of working time at all coal operations to five days a week, and the adoption of measures prohibiting the sale of coal below the cost of production were proposed in September by C. F. Hosford, Jr., president, Butler Consolidated Coal Co., Butler, Pa. Adoption of minimum wage scales, he asserted, would "eliminate much of the ruthless competition now existing," and pave the way for a real partnership between capital and labor. Limitation of working time, "admittedly unsound in theory," would immediately affect production to some extent and bring the supply closer to the demand. Any breach of the wage, working time, and cost of production regulations would constitute an "unfair trade practice," to be dealt with by the proper governmental agency independently of any action taken by the operators' association.

To carry out the plan it is suggested that operators in each district or in groups of districts affiliate themselves with an association. Funds for carrying on the work would be supplied by tonnage assessments. Each member would bind himself to comply with the rules and regulations, and no resignations would be allowed except after 90 days' notice and with the consent of 10 per cent of the members. Specific penalties would be assessed for infractions of the rules, these penalties to consist of substantial fines and reduction of the working time of the offender.

Each member of the association would fall heir to the duty of determining his own cost of production, which would later be subject to review by the association. If prepared sizes are marketed, the cost of production of each must be determined. The cost for any size will then be the minimum price at which size can be sold. Costs would be determined monthly under the operation of the plan, and the minimums thereby fixed would apply to all spot and short-term orders received during the month. Provision is made for adjustment for slack running time, short or long-term contracts, or changes in the wage scale.

Governor Flem D. Sampson, of Kentucky, was the most aggressive of the state authorities engaged in the search for a remedy for the bituminous indus-

try, and worked diligently to bring about a conference of the governors of the nine coal-producing states east of the Mississippi to develop "a plan of action which will be in the interest of the consumer, the owners of the coal mines, and the laboring man (*Coal Age*, September, 1931, p. 503)." He announced early in September that seven of the governors had signified their willingness to attend or send representatives. Conferences with operators and labor leaders followed, and Lewis Sampson, secretary to the Governor, made a trip to Ohio, Illinois, Indiana, and West Virginia to urge the coal producers to sponsor participation by the governors concerned. No date for the conference had been set at the end of the month, however.

Formation of a new competitive field to include eastern Ohio, Pennsylvania, West Virginia, and eastern Kentucky is the major recommendation in a plan developed by Governor Pinchot, Pennsylvania, which was explained to President Hoover on Sept. 24 by William S. Bennet, general counsel, Continental Coal Co., and vice-president Edward S. Hines Lumber Co. Responsibility for the stabilization of the industry lies in the hands of the operators, the Governor holds, and he suggested that the heads of the four states appoint a small committee of operators, possibly three from each state, to draw up recommendations for the governors and their fellow operators, these recommendations to serve as the basis for further deliberations on the part of the chief executives.

The "Wheeling plan" for the formation of a new competitive field in eastern Ohio, western Pennsylvania, and certain high-volatile districts in West Virginia, was the chief topic at a meeting of trade and civic leaders in Pittsburgh, Pa., Sept. 21. Amendment of the anti-trust laws, adoption of a reasonable legislative program, and the selection of a governing board of strong men in the industry to control its rejuvenation were urged by Thomas Stockham Baker, president, Carnegie Institute of Technology. Irving L. Camp, Johnstown, Pa., chairman of the Citizens' Pennsylvania Bituminous Coal Committee, outlined the work of the committee and deplored the fact that the Pittsburgh Chamber of Commerce did not join with others in western Pennsylvania in indorsing the "Wheeling plan." No coal operators or labor leaders were invited to the meeting.

C. W. & F. Plans Stoker Size

The Chicago, Wilmington & Franklin Coal Co., Chicago, plans to market in the near future a $\frac{5}{16}$-in. coarse stoker coal to take advantage of the prospective growth of the stoker in the domestic field. The coal, it is stated, will be air-cleaned and passed over a 40-mesh screen. It will carry 4 per cent of moisture on leaving the mine, according to reports, and will be treated with calcium chloride either at the mine or in the retail yard.

Coal Age Moves to New Home

Coal Age moved this month to its new home in the McGraw-Hill Building at 330 West 42d St., New York City, one and one-half blocks from Times Square. The 33-story building will house under one roof the editorial offices of the various McGraw-Hill publications, the business activities of the publishing company, the printing plant, and the offices of the McGraw-Hill Book Co. and other subsidiaries.

Mines Run Without Fatalities

Mines in Walker County, Alabama, have produced more than 3,000,000 tons of coal in the first eight months of 1931 without a single fatal accident among the 7,000 men employed, according to S. Y. Leith, district mine inspector. The Walker County record was attributed to intensive and persistent training in first-aid, mine-rescue, and accident-prevention methods under the direction of the U. S. Bureau of Mines, Alabama Department of Mines, Alabama Mining Institute, and the Joseph A. Holmes Safety Association.

Consolidation Offers Stoker

The Consolidation Coal Co. announced early in September that it would engineer, manufacture, and sell the "Firite" stoker, adapted to boilers of from 70 to 700 hp. It is asserted that the new stoker will successfully burn high- or low-volatile, high- or low-sulphur, coking or non-coking coal regardless of fusing temperatures, all without smoke or clinkers and with high efficiency. Maintenance cost also is low, the company declares. Engineering and sales will be in charge of the Hoffman Combustion Engineering Co., Detroit, Mich., and the stoker will be manufactured by the Fairmont Mining Machinery Co., Fairmont, W. Va.

Soviet Pushes Coal Production

Coal, in addition to metals, electric power generation, railroads, the chemical industry, and agriculture, will play an important part in the second five-year plan (1933-1937) for Soviet Russia. Among the projects which probably will be embarked on in the next five years is the development of the new Karaganda basin and the extension of operations in the Minusinsk and Cheremkhovsk regions, in addition to work in the more well-developed Kuznetz and Don basins. Production of coal at the end of the second five-year plan is expected to be about 450,000,000 metric tons per year, as compared with 46,456,000 tons produced in 1930 and 81,725,000 tons projected in 1931.

Tax Decision in Coal Case Favors Operators

Taxpayers may deduct from gross income in the tax years involved amounts paid for additional machinery and equipment to maintain the normal output of the mines, according to an opinion handed down by the U. S. Board of Tax Appeals in the West Virginia-Pittsburgh Coal Co. case. The board was guided in making its decision by the precedents established in the Roden Coal Co., Marsh Fork Coal Co., and Brier Hill Collieries Co. cases. In each of these cases, the decisions of the board to the effect that the expenditures in question were not deductible from gross income were reversed or found to be inconsistent. Evidence that the board has receded from the original stand was contained in the remark that "the decision of the board in Union Collieries Co., 3 B.T.A. 540, and numerous other cases denying the deduction of such items, will not be followed in the future."

Erskine Ramsay Host on Birthday

With over 3,000 of his friends in attendance, Erskine Ramsay, chairman of the board of the Alabama By-Products Corporation, played host at his famous yearly party at his home on West Redmont Road, Birmingham, Ala., Sept. 24. The occasion was Mr. Ramsay's sixty-seventh birthday, and his guests joined in extolling the part he has played in making Birmingham a leading city. A barbecue dinner and a program of speeches rounded off the party, part of which was broadcast over Station WAPI.

Somerset Institute Elects

Thomas Stakem, superintendent, Reading Iron Co., Stoyestown, Pa., was elected president of the Somerset Mining Instiute at a meeting held in Somerset, Pa., Sept. 25. Other officers were elected as follows: vice-president, Morgan Watkins, foreman, Davis Coal & Coke Co., Boswell, Pa.; secretary, R. M. Crawford, foreman, Consolidation Coal Co., Acosta, Pa.; treasurer, Fletcher W. Cunningham, Somerset. Matthew Lewis, Somerset, was again chosen to conduct the mining school in the coming winter.

McBrayer Made Superintendent

J. L. McBrayer, who entered the employ of the Colorado Fuel & Iron Co. in 1916 as a fireboss, was appointed superintendent of the Robinson No. 4 mine, Farr, Colo., Oct. 1. Mr. McBrayer, who had previously held positions as superintendent of the Lester, Rouse, Pictou, and Robinson mines, succeeds S. S. Temple, who resigned after eight years at the No. 4 mine and sixteen years with the company.

Heating Group to Be Formed

Tentative plans for the formation of a Northwest group to cooperate with the Committee of Ten—Coal and Heating Industries, were laid at a meeting in St. Paul, Minn., Sept. 18, with J. A. Maher, Maher Coal Bureau, presiding. Thirty representatives of the coal, coke, and equipment industries attended. Mr. Maher was named to head an organization committee, with Wesley E. Keller, Northwestern Retail Coal Dealers' Association, as temporary secretary. Other members of the organization committee are: J. H. W. Mackie, retail coal; W. W. Walker, coke; C. M. Spencer, anthracite; I. C. Cuvellier, *The Coal Dealer;* Homer L. Rank, pulverizing equipment; W. F. Megeath, stokers; Elmer Anderson, Minneapolis Heating and Piping Association; George B. Benton, accessories; F. W. Leagler, warm air heating; and Charles Fitts, radiators. Additions will be made from other industries.

Fordson, Inland Steel Buy Cars

The Fordson Coal Co., Stone, Ky., has placed an order with the Hockensmith Wheel & Mine Car Co. for 400 mine cars, each with a capacity of 12,000 lb. Five hundred mine cars, each with a capacity of 12,000 lb., have been ordered from the Koppel Industrial Car & Equipment Co. by the Inland Steel Co., Wheelwright, Ky. The cars are to be equipped with Timken antifriction bearings.

Barge Service Inaugurated

Two barge loads of coal left St. Louis, Mo., early in July to inaugurate a coal-carrying service by the Inland Waterways Corporation between that city and St. Paul, Minn. Two additional loads of 800 to 1,000 tons each, the capacity of the upper Mississippi, will be forwarded each week for the remainder of the season. The service was made possible by the cooperation of the O'Gara Coal Co., Chicago; Kavanaugh Coal Co., St. Louis; and the city of St. Paul, and is expected to demonstrate to coal shippers the advantages of building their own barge fleets.

Kentucky Makes Safety Progress

With fourteen coal companies, the National Coal Association, the U. S. Bureau of Mines, and the Kentucky Department of Mines represented, the initial meeting of the Big Sandy Mining Institute was held at Prestonsburg, Ky., last month. Officers were elected as follows: president, R. C. Thomas, superintendent, North-East Coal Co., Paintsville; vice-presidents, E. R. Price, superintendent, Inland Steel Co., Wheelwright, and B. M. Rogers division superintendent, Consolidation Coal Co., Jenkins; secretary, J. F. Porter, Department of Mines of Kentucky; treasurer, Joe Sheader, safety engineer, Elkhorn Coal Corporation, Wayland, Ky. Rescue Station No. 5, Pikeville, Ky., was choosen as the meeting place of the institute.

Steps toward affiliation with the Hazard Safety Institute were taken by operators in the Jenkins (Ky.) district after a recommendation to that effect was made by John F. Daniel, chief, Kentucky Department of Mines, at a meeting on Sept. 17. A joint meeting will be held at Whitesburg in the near future to consider enlarging and strengthening the Hazard organization.

Coal Men Test Stokers

To obtain first-hand information as to the performance of stokers in actual service, the Gauley Mountain Coal Co. has installed a stoker in one of its buildings at Ansted, W. Va., and the Slab Fork Coal Co. has placed a machine in service at the Slab Fork (W. Va.) store. Monthly records of performance, heating costs, and similar details, as well as tests to determine efficiencies with coals of various types and sizes, will be compiled for the benefit of producers, manufacturers, and consumers.

Industrial Notes

WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa., has reorganized its industrial sales department under the direction of O. F. STROMAN, industrial sales manager. BERNARD LESTER and C. B. STAINBACK have been appointed assistant sales managers. Mr. Lester will have charge of five new industrial classifications, which will have the following as managers: G. E. STOLTZ, mining and metal working electrification; G. D. BOWNE, general mill electrification; J. W. SPEER, machinery electrification; E. B. BREMER, appliance electrification; and E. F. MEAD, general industrial resales. Nine divisions will be under the supervision of Mr. Stainback, with the following managers: J. R. OLNHAUSEN, medium alternating-current motors; R. M. DAVIS, medium direct-current motors; R. O. WATSON, large motors; D. H. BYERLY, small motors; W. W. REDDIE, welding; T. C. KELLEY, industrial heating apparatus; W. G. BALPH, safety switches; W. H. MCGILLIVRAY, controls; and W. W. HORST, cost section. J. M. MCKIBBIN, JR., has been appointed manager of the promotion and advertising section under the joint direction of the assistant managers. ROSCOE SEYBOLD, formerly assistant to the president, has been made comptroller for the Westinghouse company.

LUDLOW VALVE MFG. CO., Troy, N. Y., will manufacture in Canada as the Canadian Ludlow Valve Mfg. Co., with offices at 930 Wellington St., Montreal, Quebec.

NATIONAL ACME CO., Cleveland, Ohio, and Windsor, Vt., has entered into a license agreement with the Dardelet Threadlock Corporation for the manufacture, use, and sale of bolts, nuts, and screw machine products threaded with the Dardelet self-locking screw thread.

THE SHOVEL INTERESTS of the Ames Shovel & Tool Co., Hubbard, & Co., Wyoming Shovel Works, Pittsburgh Shovel Co., and Baldwin Tool Works have been sold to a new company, the Ames Baldwin Wyoming Shovel Co. All the plants of the predecessor companies will continue in operation, and the former trade names will be retained.

SULLIVAN MACHINERY CO., Chicago, has made LEON J. CONE district manager at Duluth, Minn. Mr. Cone succeeds JONATHAN A. NOYES, who has been promoted to the position of manager of the coal machinery sales division, with headquarters at Chicago.

R. C. TODD, assistant general manager of sales, has been appointed assistant vice-president of the American Rolling Mill Co., Middletown, Ohio. Mr. Todd is succeeded as assistant sales manager by H. M. RICHARDS, who was manager of the Cleveland (Ohio) sales district. FOSTER E. WORTLEY, assistant manager of the Pittsburgh (Pa.) office, takes Mr. Wortley's place in Cleveland, and will be assisted by O. L. CONLEY.

LAMONTE J. BELNAP, for several years president of the Worthington Pump & Machinery Corporation, Harrison, N. J., has been elected chairman of the executive committee of the company. HARRY C. BEAVER, vice-president, succeeds Mr. Belnap as president.

W. J. MCDONOUGH has joined the sales force of the Northern Equipment Co., Erie, Pa., maker of feed water regulators and allied equipment.

W. C. BRUTON, for many years sales engineer at the Oakland (Calif.) office of the American Manganese Steel Co., Chicago Heights, Ill., has been appointed district sales manager for the Pacific Northwest region, comprising Oregon, Washington, British Columbia, and the Coeur d'Alene district of Idaho. Mr. Bruton's headquarters will be at 411 Colman Building, Seattle, Wash.

DAYTON RUBBER MFG. CO., Dayton, Ohio, has erected the ninth manufacturing unit for the production of "Cog-Belt" and standardized fractional horsepower drives, fan belts, and tires.

C. W. TRAUGHBER, connected with the smelting industry for many years, has been appointed to the technical and metallurgical staff of the Northern Blower Co., Cleveland, Ohio.

WILLIAM T. BENTZ has been appointed manager of sales of rail steel products for the Republic Steel Corporation, Youngstown, Ohio. Mr. Bentz was formerly sales manager for Steel & Tubes, Inc., a Republic subsidiary. He will continue at his present headquarters in Cleveland, Ohio.

Fatalities and Death Rate Decline in August; Accidents Kill 112 Miners

ACCIDENTS at coal mines in the United States during August, 1931, caused the death of 112 men, according to information furnished by state mine inspectors to the U. S. Bureau of Mines. This was one more than the number reported in July, 1931, but it was 51 less than the number of men killed in August, 1930. Production of coal amounted to 34,848,000 tons in August of the present year, an increase of 3.27 per cent over the 33,744,000 tons mined in the preceding month, but a reduction of 16.66 per cent from the output of 41,814,000 tons in August, 1930. The death rates per million tons, based on these figures, were 3.21 for the present month, as compared with 3.29 for July, 1931, and 3.90 for August, 1930. Thus the safety record for August, 1931, was better than that of either of the other two months referred to.

For bituminous mines alone, the fatality rate of 2.78 for August of the present year compares with 3.02 for the preceding month of July, and of 3.28 for August a year ago. Eighty-five men were killed in bituminous mines in August, 1931, as compared with 90 in July, 1931, and 117 in August, 1930. In the anthracite mines of Pennsylvania 27 men were killed in August, 1931, as compared with 21 in July and 46 in August, 1930. The fatality rates for these months were 6.26, 5.31, and 7.48, respectively.

During the first eight months of 1931, 960 lives were lost in mining 289,931,000 tons of coal. In the corresponding period of 1930 there was a loss of 1,322 lives in mining 346,377,000 tons of coal. The fatality rate, 3.31 per million tons for the period January to August, 1931, sets a new milestone for safety in mines in the United States as far as the human-life cost of coal is concerned. The rate of 3.31 represents an improvement of 13 per cent as compared with the rate of 3.82 for the corresponding months of 1930, and it indicates a better situation than has obtained in the coal industry during any past year.

The death rate for bituminous mines alone decreased from 3.41 for the first eight months of 1930 to 2.79 for the same period in 1931. There were 1,025 deaths during the eight-month period of 1930 and 699 during the same months in 1931. The decrease in the fatality rate for bituminous mines amounted to 18 per cent in favor of the current year.

The record for anthracite mines was not so marked, the fatalities declining from 297 in the eight-month period of 1930 to 261 for the same period of 1931, and the death rate remaining practically unchanged, being 6.55 for 1930 and 6.56 for 1931.

There were no major disasters in August—that is, none in which five or more lives were lost. There were three such disasters in January and one in May which caused the loss of 46 lives. In the period from January to August, 1930, there were eight major disasters in which 96 lives were lost. Based exclusively on these disasters, the death rates per million tons were 0.159 and 0.277, respectively, for 1931 and 1930. Major disasters thus far in 1931 have occurred at the rate of 1.38 separate disasters (as distinguished from the number of deaths resulting from the disasters) for each hundred million tons of coal mined, as compared with 2.31 for the corresponding period in 1930.

Comparing the accident record for the first eight months of 1931 with that of the same months of 1930, a reduction is noted in the death rates from falls of roof and coal, haulage, gas or dust explosions, explosives, and electricity. The comparative rates are as follows:

Cause	1930 Fatalities	1930 Rate	Jan.-Aug. 1930 Fatalities	Jan.-Aug. 1930 Rate	Jan.-Aug. 1931 Fatalities	Jan.-Aug. 1931 Rate
All causes	2,014	3.793	1,322	3.817	960	3.311
Falls of roof and coal	1,067	2.009	719	2.076	554	1.911
Haulage	303	.571	221	.638	165	.569
Gas or dust explosions:						
Local explosions	61	.115	44	.127	12	.042
Major explosions	214	.403	85	.245	46	.158
Explosives	78	.147	56	.162	26	.090
Electricity	76	.143	54	.156	39	.134
Miscellaneous	215	.405	143	.413	118	.407

Coal-Mine Fatalities During August, 1931, by Causes and States

(Compiled by Bureau of Mines and published by *Coal Age*)

State	Underground											Shaft					Surface							Total by States	
	Falls of roof (coal, rock, etc.)	Falls of face or pillar coal	Mine cars and locomotives	Explosions of gas or coal dust	Explosives	Suffocation from mine gases	Electricity	Animals	Mining machines	Mine fires (burned, suffocated, etc.)	Other causes	Total	Falling down shafts or slopes	Objects falling down shafts or slopes	Cage, skip, or bucket	Other causes	Total	Mine cars and mine locomotives	Electricity	Machinery	Boilers, explosions of bursting steam pipes	Railway cars and locomotives	Other causes	Total	1931	1930
Alabama											1	1													1	8
Alaska																									0	0
Arkansas																									0	1
Colorado	1		1									2											1	1	3	3
Illinois	3		2								2	7													7	11
Indiana							1					1													1	0
Iowa	2											2													2	1
Kansas																									0	0
Kentucky	4		1								1	6						2				1		3	9	13
Maryland																									0	1
Michigan																									0	0
Missouri	1											1													1	1
Montana																									0	1
New Mexico																									0	0
North Dakota																									0	0
Ohio	3		1									4													4	5
Oklahoma	2											2													2	3
Pennsylvania (bituminous)	9	6	1				2					18													18	24
South Dakota																									0	0
Tennessee	1											1													1	2
Texas																									0	0
Utah																									0	1
Virginia	2		1									3													3	2
Washington																									0	1
West Virginia	13	5	8	1			3				1	31						1	1					2	33	36
Wyoming																									0	3
Total (bituminous)	41	11	15	1			6				5	79						3	1			1	1	6	85	117
Pennsylvania (anthracite)	13	2	2		2						3	22						2	1	1			1	5	27	46
Total, August, 1931	54	13	17	1	2		6				8	101						5	2	1		1	2	11	112	
Total, August, 1930	77	12	28	1	9	5	12		2		2	148	2			1	3	4	2			2	4	12		163

MARKETS

in Review

WARM weather kept the bituminous coal markets of the country under its thumb in September and prevented the expected upturn in domestic business until the last week in the month. In spite of the prevailing temperatures, however, a slight but definite improvement in the domestic situation was noticeable. Dealers showed some disposition to replenish stocks, and price advances gave promise of a more satisfactory realization in the coming months. The steam trade continued in its long-standing slump. Slack and screenings quotations were surprisingly firm however, easing off in only a limited number of instances.

September proved to be a slow month in the principal anthracite markets of the country. Warm weather, coupled with extensive stock replenishments in August, slowed the movement from the mines and prevented the usual fall recovery. Buckwheat and rice were the favored sizes, and stove displaced egg as the most active domestic coal. Chestnut improved its position slightly. Pea was neglected, and decreased consumption made barley soft.

September production of bituminous coal is estimated by the U. S. Bureau of Mines at 31,806,000 net tons, an increase of 1,272,000 tons over the August output of 30,534,000 tons, but a decrease of 6,826,000 tons from the total output in September, 1930. Anthracite production is estimated at 4,352,000 net tons for September. This compares with 4,314,000 tons in the preceding month and 5,199,000 tons in September of last year.

Dumpings at the lower lake ports for the season to Sept. 28 were: cargo, 22,153,329 tons; fuel, 729,475 tons; total, 22,882,804 tons. Dumpings in the same period in 1930 were: cargo, 28,446,826 tons; fuel, 1,018,356 tons; total, 29,465,182 tons.

Coal Age Index of spot bituminous prices (preliminary) was: 135, Sept. 5; 134, Sept. 12; and 133, Sept. 19 and 26. Corresponding weighted average prices were: $1.63, Sept. 5; $1.62, Sept. 12; and $1.61, Sept. 19 and 26. Revised Index figures for August were: 131, Aug. 1, 8, and 15; 130, Aug. 22; and 131, Aug. 29. Corresponding weighted average prices were: $1.58, Aug. 1; $1.59, Aug. 8 and 15; $1.57, Aug. 22; and $1.59, Aug. 29. The monthly Index for August was 130¾, as compared with the unrevised figure of 133¾ for September.

Activity in the Chicago market during September was controlled by the vagaries of the weather, being fairly good at the beginning and end of the month and almost absent during the in-between weeks. Domestic sizes received the bulk of attention, and the outstanding feature of the market was the fact that the September lists were carried into October without change by producers in all fields.

Second grades of Illinois and Indiana screenings were weak in large dumps, but firm on ordinary sales. The quantity in storage at the mines was considerably less than in the same month in 1930. Western Kentucky producers boosted screenings prices from 15@20c. earlier in September to 25@35c. at the end, largely as a result of restricted running time. Prices on prepared sizes from the same field also rose 25c.

MOVEMENT of Eastern coals into Chicago was relatively light in September. Shipments of smokeless mine-run on retail contracts averaged about 50 per cent of the normal rate. Deliveries on lump and egg were sufficient to absorb the production, but an excess of stove and small nut made these sizes weak and slow. High-volatile block and egg generally lagged,

Current Quotations—Spot Prices, Anthracite—Net Tons, F.O.B. Mines

		Week Ended							
		Sept. 5, 1931		Sept. 12, 1931		Sept. 19, 1931		Sept. 26, 1931	
	Market Quoted	Independent	Company	Independent	Company	Independent	Company	Independent	Company
Broken	New York		$7.50		$7.50		$7.50		$7.50
Broken	Philadelphia	$7.50@$7.75	7.50	$7.50@$7.75	7.50	$7.50@$7.75	7.50	$7.50@$7.75	7.50
Egg	New York	7.60@ 7.75	7.75	7.50@ 7.75	7.75	7.50@ 7.75	7.75	7.50@ 7.75	7.75
Egg	Philadelphia	7.75@ 8.00	7.75	7.75@ 8.00	7.75	7.75@ 8.00	7.75	7.75@ 8.00	7.75
Egg	Chicago	7.75	7.75	7.75	7.75	7.75	7.75	7.75	7.75
Stove	New York	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
Stove	Philadelphia	8.00@ 8.25	8.00	8.00@8.25	8.00	8.00@ 8.25	8.00	8.00@ 8.25	8.00
Stove	Chicago	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
Chestnut	New York	8.00	8.00	7.50 8.00	8.00	7.50@ 8.00	8.00	7.60@ 8.00	8.00
Chestnut	Philadelphia	8.00@ 8.25	8.00	8.00@ 8.25	8.00	8.00@ 8.25	8.00	8.00@ 8.25	8.00
Chestnut	Chicago	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
Pea	New York	5.50@ 5.75	5.75	5.40@ 5.75	5.75	5.40@ 5.75	5.75	5.40@ 5.75	5.75
Pea	Philadelphia	5.75@ 6.00	5.75	5.75@ 6.00	5.75	5.75@ 6.00	5.75	5.75@ 6.00	5.75
Pea	Chicago	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75
Buckwheat	New York	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25
Buckwheat	Philadelphia	3.25@ 3.50	3.25	3.25@ 3.50	3.25	3.25@ 3.50	3.25	3.25@ 3.50	3.25
Buckwheat	Chicago	3.25@ 3.75	3.25	3.25@ 3.75	3.25	3.25@ 3.75	3.25	3.25@ 3.75	3.25
Rice	New York	1.70@ 1.85	1.85	1.70@ 1.85	1.85	1.75@ 1.85	1.85	1.75@ 1.85	1.85
Rice	Philadelphia	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85
Rice	Chicago	1.85@ 2.35	1.85	1.85@ 2.35	1.85	1.85@ 2.35	1.85	1.85@ 2.35	1.85
Barley	New York	1.00@ 1.25	1.40	1.00@ 1.25	1.40	.90@ 1.25	1.40	.90@ 1.25	1.40
Barley	Philadelphia	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40

but the higher September prices were maintained by the majority of the producers. Slack—both high- and low-volatile—moved very slowly, and prices weakened materially.

September brought little joy to the St. Louis trade. Hot weather terminated abruptly the slight spurt in domestic sizes at the first of the month, and the depression was further heightened by the reluctance of retailers, faced with credit difficulties and delayed buying, to take the usual seasonal quotas. Maximum prices were somewhat higher in September than in August, but producers had much difficulty in supporting them. Steam movement was very slow, but prices were unusually firm.

The end of September brought some improvement to the Southwest, after three weeks of warm weather. Retail stocks in city yards were below normal, but dealers continued to play the waiting game. Country buying, however, was a factor of real strength in the market. Prices were moderately stronger, though they failed to exceed August tops. Kansas distress screenings failed to sell below $1, with most of the tonnage going at $1.25. Shovel lump commanded $2.25. Production in September was but little below a year ago, but sales lagged far behind.

A slight increase in the demand for both screenings and domestic sizes was noticeable at the Head of the Lakes in September. Receipts at the Duluth-Superior docks continued to run behind last year, however. Totals for the season to Sept. 1 were: bituminous coal, 4,219,226 tons; anthracite, 266,456 tons; coke, 41,210 tons. Receipts for the corresponding period in 1930 were: bituminous, 6,708,752 net tons; anthracite, 385,889 tons; coke, 67,486 tons.

Warm weather in September continued to depress domestic buying in the consuming territory served by Colorado producers, though a great many orders were booked for future delivery. Prevailing prices were: Colorado bituminous lump, $4; washed nut, $3.50; steam sizes, $1.50@$1.75; Crested Butte anthracite furnace, $8.80; base burner, $8.50; Rock Springs (Wyo.) 8-in. lump, $4; nut, $3.50; grate, $3.75; steam sizes, $1.50@$1.70.

High temperatures halted the usual seasonal buying of domestic sizes in the Louisville market. Steam demand was quiet, though some improvement was reported in takings for iron and steel. Railroad demand was fair, but utility consumption was below normal. September prices in general were approximately equal to those prevailing in August, with the exception of a decline in slack.

Quietness descended on the Cincinnati market in September in the wake of balmy weather. The unexpected slackness, however, gave retailers and other heavy buyers an opportunity to replenish depleted stockpiles, thus removing the possibility of a crisis following a sudden turn in weather conditions. One fact became increasingly apparent as the month wore on, and that was that prices apparently have reached bottom for the year. There was little or no evidence of concessions to stimulate what was an out-of-the-ordinary lack of activity. Lake business continued at a steady pace, but its influence on the Cincinnati trade was almost nil.

Smokeless producers found it necessary to make slight cuts in lump and egg quotations to keep these sizes moving at the end of the month. Prices on mine-run and smaller sizes were ragged throughout September. In the high-volatile list, block and lump were the favorite sizes. Egg was a drug on the market and some disposition to sacrifice it was evident about the middle of the month. The market for steam mine-run was none too firm, but gas and byproduct varieties were strong. Smokeless competition resulted in some weakening in high-volatile slack quotations, but this size retraced most of the ground before the month ended.

LOWER temperatures at the end of September rescued domestic sizes from a three-weeks depression in the Columbus market. The reluctance of householders to lay in supplies for the winter was an additional deterrent in the domestic market. Steam demand was rather quiet. Most manufacturing industries continued with reduced fuel requirements, but slight signs of improvement were noticeable in the takings of railroads and utilities. Users persisted in their refusal to replenish stocks. The lake trade took a fair tonnage in September. Prices on both high- and low-volatile domestic sizes held their own during the month, with advances on smokeless egg and certain premium splints and blocks.

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

LOW-VOLATILE EASTERN	Market Quoted	Week Ended Sept. 5, 1931	Sept. 12, 1931	Sept. 19, 1931	Sept. 26, 1931
Smokeless lump	Chicago	$3.00@$3.25	$3.00@$3.25	$3.00@$3.25	$3.00@$3.25
Smokeless egg	Chicago	3.25@ 3.50	3.25@ 3.50	3.00@ 3.50	3.00@ 3.50
Smokeless stove	Chicago	2.50@ 2.75	2.50@ 2.75	2.50@ 2.75	2.50@ 2.75
Smokeless nut	Chicago	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50
Smokeless pea	Chicago	1.25@ 2.25	1.25@ 2.25	1.25@ 2.25	1.25@ 2.25
Smokeless mine-run	Chicago	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00
Smokeless slack	Chicago	.40@ 1.00	.40@ 1.00	.40@ 1.00	.40@ 1.00
Smokeless lump	Cincinnati	2.75@ 3.00	3.00	3.00	2.75@ 3.00
Smokeless egg	Cincinnati	3.00@ 3.25	3.25	3.25	3.00@ 3.25
Smokeless stove	Cincinnati	2.25@ 2.75	2.50@ 2.75	2.50@ 2.75	2.25@ 2.75
Smokeless nut	Cincinnati	1.25@ 1.50	1.25@ 1.50	1.25@ 1.50	1.25@ 1.50
Smokeless mine-run	Cincinnati	1.65@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00
Smokeless slack	Cincinnati	.35@ .50	.35@ .50	.35@ .60	.35@ .75
*Smokeless mine-run	Boston	3.90@ 4.10	3.90@ 4.10	3.90@ 4.10	3.90@ 4.10
*Smokeless nut-and-slack	Boston	2.91@ 3.10	2.91@ 3.10	2.91@ 3.10	2.91@ 3.10
Clearfield mine-run	Boston	1.40@ 1.65	1.40@ 1.65	1.40@ 1.65	1.40@ 1.65
Clearfield mine-run	New York	1.50@ 1.75	1.50@ 1.75	1.50@ 1.75	1.50@ 1.75
Cambria mine-run	Boston	1.60@ 1.90	1.60@ 1.90	1.60@ 1.90	1.60@ 1.90
Somerset mine-run	Boston	1.50@ 1.85	1.50@ 1.85	1.50@ 1.85	1.50@ 1.85
Pool 1 (Navy Standard)	New York	1.90@ 2.25	1.90@ 2.25	1.96@ 2.25	1.90@ 2.25
Pool 1 (Navy Standard)	Philadelphia	1.90@ 2.20	1.90@ 2.20	1.90@ 2.20	1.90@ 2.20
Pool 9 (super low-vol.)	New York	1.60@ 1.80	1.60@ 1.80	1.60@ 1.80	1.60@ 1.80
Pool 9 (super low-vol.)	Philadelphia	1.65@ 1.75	1.65@ 1.75	1.65@ 1.75	1.65@ 1.75
Pool 10 (h. gr. low-vol.)	New York	1.50@ 1.60	1.50@ 1.60	1.50@ 1.60	1.56@ 1.60
Pool 10 (h. gr. low-vol.)	Philadelphia	1.40@ 1.60	1.40@ 1.60	1.40@ 1.60	1.40@ 1.60
Pool 11 (low-vol.)	New York	1.35@ 1.45	1.35@ 1.45	1.35@ 1.45	1.35@ 1.45
Pool 11 (low-vol.)	Philadelphia	1.35@ 1.45	1.35@ 1.45	1.35@ 1.45	1.35@ 1.45
HIGH-VOLATILE, EASTERN					
Pool 54-64 (gas and st.)	New York	$0.90@$1.05	$0.90@$1.05	$0.90@$1.05	$0.90@$1.05
Pool 54-64 (gas and st.)	Philadelphia	1.00@ 1.15	1.00@ 1.15	1.00@ 1.15	1.00@ 1.15
Pittsburgh sc'd gas	Pittsburgh	1.40@ 1.60	1.40@ 1.60	1.40@ 1.60	1.40@ 1.60
Pittsburgh steam lump	Pittsburgh	1.35@ 1.65	1.35@ 1.65	1.35@ 1.65	1.35@ 1.65
Pittsburgh egg	Pittsburgh	1.50@ 1.65	1.50@ 1.65	1.50@ 1.65	1.50@ 1.65
Pittsburgh gas mine-run	Pittsburgh	1.30@ 1.40	1.30@ 1.40	1.30@ 1.40	1.30@ 1.40
Pittsburgh steam mine-run	Pittsburgh	1.20@ 1.50	1.20@ 1.50	1.20@ 1.50	1.20@ 1.50
Pittsburgh gas slack	Pittsburgh	.75@ .95	.75@ .95	.75@ .95	.75@ .95
Pittsburgh steam slack	Pittsburgh	.60@ .70	.60@ .70	.60@ .70	.60@ .70
Connellsville coking coal	Pittsburgh	1.25@ 1.55	1.25@ 1.55	1.25@ 1.55	1.25@ 1.55
Westmoreland lump	Philadelphia	1.70@ 1.95	1.70@ 1.95	1.70@ 1.95	1.70@ 1.95
Westmoreland ¾-in. lump	Philadelphia	1.65@ 1.80	1.65@ 1.80	1.65@ 1.80	1.65@ 1.80
Westmoreland egg	Philadelphia	1.50@ 1.60	1.50@ 1.60	1.50@ 1.60	1.50@ 1.60
Westmoreland mine-run	Philadelphia	1.50@ 1.65	1.50@ 1.65	1.50@ 1.65	1.50@ 1.65
Westmoreland slack	Philadelphia	1.00@ 1.15	1.00@ 1.15	1.00@ 1.15	1.00@ 1.15
Fairmont lump	Fairmont	1.25@ 1.50	1.25@ 1.50	1.25@ 1.60	1.25@ 1.60
Fairmont ¾-in. lump	Fairmont	1.10@ 1.25	1.10@ 1.25	1.10@ 1.30	1.10@ 1.30
Fairmont egg	Fairmont	1.00@ 1.25	1.00@ 1.30	1.00@ 1.30	1.00@ 1.30
Fairmont mine-run	Fairmont	.90@ 1.05	.90@ 1.10	.90@ 1.10	.90@ 1.10
Fairmont slack	Fairmont	.50@ .85	.50@ .85	.50@ .85	.50@ .85
Kanawha lump	Cincinnati	1.35@ 1.75	1.35@ 1.75	1.25@ 1.75	1.25@ 1.75
Kanawha egg	Cincinnati	1.10@ 1.50	1.10@ 1.50	1.00@ 1.40	1.00@ 1.50
Kanawha mine-run (gas)	Cincinnati	1.35@ 1.60	1.35@ 1.60	1.35@ 1.60	1.35@ 1.60
Kanawha mine-run (st.)	Cincinnati	1.00@ 1.25	.90@ 1.25	1.00@ 1.25	1.00@ 1.25
Kanawha nut-and-slack	Cincinnati	.35@ .50	.35@ .50	.35@ .50	.35@ .50
Williamson (W.Va.) lump	Cincinnati	1.25@ 1.75	1.25@ 1.75	1.25@ 1.75	1.25@ 1.75
Williamson (W.Va.) egg	Cincinnati	1.10@ 1.50	1.10@ 1.50	1.00@ 1.40	1.00@ 1.40
Williamson (W.Va.) mine-run (gas)	Cincinnati	1.35@ 1.60	1.35@ 1.60	1.35@ 1.60	1.35@ 1.60
Williamson (W.Va.) mine-run (st.)	Cincinnati	1.00@ 1.25	1.00@ 1.25	1.00@ 1.25	1.00@ 1.25
Williamson (W.Va.) nut-and-slack	Cincinnati	.35@ .60	.35@ .50	.35@ .60	.35@ .50
Logan (W.Va.) lump	Cincinnati	1.25@ 1.50	1.25@ 1.50	1.25@ 1.50	1.25@ 1.50
Logan (W.Va.) egg	Cincinnati	1.00@ 1.40	1.00@ 1.35	1.00@ 1.35	1.00@ 1.35
Logan (W.Va.) mine-run	Cincinnati	1.10@ 1.40	1.10@ 1.40	1.10@ 1.40	1.10@ 1.50
Logan (W.Va.) nut-and-slack	Cincinnati	.35@ .50	.35@ .50	.35@ .50	.35@ .50
Logan (W.Va.) slack	Cincinnati	.35@ .50	.35@ .50	.35@ .50	.35@ .50
Hocking (Ohio) lump	Columbus	1.70@ 1.85	1.70@ 1.85	1.70@ 1.85	1.70@ 1.85
Hocking (Ohio) egg	Columbus	1.50@ 1.65	1.50@ 1.65	1.50@ 1.65	1.50@ 1.65
Hocking (Ohio) mine-run	Columbus	1.35@ 1.45	1.35@ 1.45	1.35@ 1.45	1.35@ 1.45
Hocking (Ohio) nut-and-slack	Columbus	.75@ 1.10	.75@ 1.10	.70@ 1.00	.70@ 1.00
Pitts. No. 8 (Ohio) lump	Cleveland	1.50@ 1.75	1.50@ 1.75	1.50@ 1.75	1.50@ 1.75
Pitts. No. 8 (Ohio) ¾-in. lump	Cleveland	1.15@ 1.30	1.15@ 1.30	1.15@ 1.30	1.15@ 1.30
Pitts. No. 8 (Ohio) egg	Cleveland	1.20@ 1.35	1.20@ 1.35	1.20@ 1.35	1.20@ 1.35
Pitts. No. 8 (Ohio) mine-run	Cleveland	1.10@ 1.15	1.10@ 1.15	1.10@ 1.15	1.10@ 1.15
Pitts. No. 8 (Ohio) slack	Cleveland	.55@ .65	.55@ .65	.55@ .65	.55@ .65

*Gross tons, f.o.b. vessels, Hampton Roads.

The Cleveland market was at a standstill in September, with slackness in demand for both steam and domestic sizes predominating. Slack prices dropped 10c., but quotations on the other sizes held firm at August levels.

Warm weather in September reduced the movement of domestic coal in the Pittsburgh market to a level materially below the normal for the time of the year. Industrial requirements were equal to those prevailing in August, which, in turn, however, was much below the July level. Quotations were, in general, slightly higher than in August.

The last week of September revived the Fairmont market after some weeks of depression brought on by unseasonable warmth. Prepared and fine coal prices were both at rock bottom at the same time, contrary to the usual situation, and neither showed any evidence of rising in response to the last-week recrudescence of buying.

Central Pennsylvania interests moved into October in a more cheerful frame of mind, after weeks of inactivity following in the wake of high temperatures. A marked increase in production at the end of September was largely responsible for the improved outlook. Prices also perked up to the following at the end of the month: Pool 1, $2@$2.25; Pool 71, $1.80@$2; Pool 9, $1.65@$1.80; Pool 10, $1.50@$1.70; Pool 11, $1.40@$1.50.

MILD weather in September cancelled the slight improvement registered in the New England market in August. Buyer indifference and hand-to-mouth purchasing resulted in the reappearance of distress coal at Hampton Roads. No. 1 smokeless mine-run sold off to $3.85 and nut-and-slack dropped to $2.90 per gross ton, f.o.b. vessels. Reduced manufacturing schedules, abundant waterpower, and oil competition played a part in the September slump. Prices on cars at Boston for inland delivery were softer as the month wore on, with good stoker coal down to $4 and mine-run quite frequently materially under $5.25. All-rail movement from central Pennsylvania improved to some extent, largely in the specialties. Prices, however, failed to rise above the previous level.

The New York trade strained its eyes in vain for some improvement in September. Dealer buying showed only the slightest of gains, and even these were almost wiped out when the weather turned hot. Factory owners continued to buy for current needs only. With consumption depressed, there was little opportunity for increased business in either the spot or contract markets. A few orders were received for industrial heating, but the number was smaller than in previous years. Domestic quotations were slightly higher in September. Slack was weak, and mine-run was unchanged.

Cooler weather in the last week of September rescued the Philadelphia trade from the doldrums, and brought in a cheering number of orders and inquiries. Textile plants, in particular, increased their takings, and definite increases were shown in the movement to retail yards and to manufacturing plants for heating purposes. The tidewater trade also showed some signs of an interest in life, but bunkering failed to recover from its long period of stagnation. Quotations showed no material change.

A cold snap at the end of September and some buying for stocks by dealers ended the domestic buying strike with which the Birmingham market had been struggling. Steam sizes, however, remained in their long-standing slump. Domestic quotations were advanced to the following on Oct. 1: Cahaba lump and egg, $3.25@$4.25; nut, $3@$3.25; Black Creek lump and egg, $3.75@$4; nut, $3; Corona lump and egg, $2.60; nut, $2.35; Big Seam and Carbon Hill lump and egg, $2.15@$2.25; nut, $2.15@$2.20.

Warm weather delayed the fall recovery and made September just another summer month in the New York anthracite market. Retailers had prepared for the expected demand by stocking up in August, with the result that few replenishments were necessary in September. While a temperature drop at the end of the month started a better movement from the yards, the total was not sufficient to affect greatly the wholesale demand. Buckwheat and rice were the only sizes really in demand, while stove displaced egg as the most active domestic size. Chestnut improved its position slightly, while pea was thoroughly neglected. Decreased takings kept barley soft.

Conditions in the Philadelphia anthracite market closely paralleled those prevailing in New York in September.

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

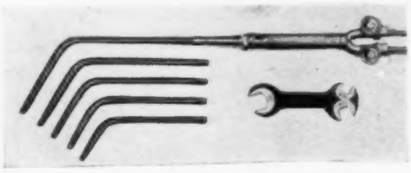
MIDDLE WEST	Market Quoted	Week Ended Sept. 5, 1931	Sept. 12, 1931	Sept. 19, 1931	Sept. 26, 1931
Franklin (Ill.) lump	Chicago	$2.90	$2.90	$2.90	$2.90
Franklin (Ill.) egg	Chicago	2.45@2.65	2.45@2.65	2.45@2.65	2.45@2.65
Franklin (Ill.) mine-run	Chicago	2.15	2.15	2.15	2.15
Franklin (Ill.) screenings	Chicago	1.00@1.60	1.10@1.60	1.10@1.60	1.10@1.60
Central (Ill.) lump	Chicago	1.75@2.15	1.75@2.15	1.75@2.15	1.75@2.15
Central (Ill.) egg	Chicago	1.50@2.05	1.50@2.05	1.50@2.05	1.50@2.05
Central (Ill.) mine-run	Chicago	1.70@1.90	1.70@1.90	1.70@1.90	1.70@1.90
Central (Ill.) screenings	Chicago	.75@1.25	.75@1.25	.75@1.25	.75@1.25
Ind. 4th Vein lump	Chicago	2.50@2.75	2.50@2.75	2.50@2.75	2.50@2.75
Ind. 4th Vein egg	Chicago	2.40@2.60	2.40@2.60	2.40@2.60	2.40@2.60
Ind. 4th Vein mine-run	Chicago	1.75@2.00	1.75@2.00	1.75@2.00	1.75@2.00
Ind. 4th Vein screenings	Chicago	1.00@1.30	1.00@1.30	1.00@1.30	1.00@1.30
Ind. 5th Vein lump	Chicago	1.60@2.10	1.60@2.10	1.60@2.10	1.60@2.10
Ind. 5th Vein egg	Chicago	1.60@2.10	1.60@2.10	1.60@2.10	1.60@2.10
Ind. 5th Vein mine-run	Chicago	1.20@1.75	1.20@1.75	1.20@1.75	1.20@1.75
Ind. 5th Vein screenings	Chicago	.35@ .90	.35@ .90	.35@ .90	.35@ .90
Mt. Olive (Ill.) lump	St. Louis	1.75@2.00	1.75@2.00	1.75@2.00	1.75@2.00
Mt. Olive (Ill.) egg	St. Louis	1.75@1.90	1.75@1.90	1.75@1.90	1.75@1.90
Mt. Olive (Ill.) mine-run	St. Louis	1.40@1.60	1.40@1.60	1.40@1.60	1.40@1.60
Mt. Olive (Ill.) screenings	St. Louis	.80@1.00	.80@1.00	.80@1.00	.80@1.00
Standard (Ill.) lump	St. Louis	1.50@1.75	1.50@1.75	1.50@1.75	1.50@1.75
Standard (Ill.) egg	St Louis	1.50@1.75	1.50@1.75	1.50@1.75	1.50@1.75
Standard (Ill.) mine-run	St. Louis	1.30@1.50	1.30@1.50	1.30@1.50	1.30@1.50
Standard (Ill.) screenings	St. Louis	.60@ .75	.60@ .75	.60@ .75	.60@ .75
West Ky. lump	Louisville	1.35@1.70	1.35@1.70	1.35@1.70	1.35@1.70
West Ky. egg	Louisville	1.15@1.60	1.25@1.60	1.25@1.60	1.25@1.60
West Ky. nut	Louisville	1.00@1.50	1.00@1.50	1.00@1.50	1.00@1.50
West Ky. mine-run	Louisville	.85@1.30	.85@1.30	.85@1.30	.85@1.30
West Ky. screenings	Louisville	.35@ .60	.25@ .60	.15@ .40	.15@ .35
West Ky. lump	Chicago	1.25@1.35	1.25@1.35	1.50@1.70	1.35@1.70
West Ky. egg	Chicago	1.25@1.35	1.25@1.35	1.00@1.50	1.25@1.50
West Ky. nut	Chicago	1.00@1.15	1.00@1.15	.90@1.15	1.10@1.25
West Ky. screenings	Chicago	.35@ .50	.25@ .50	.15@ .50	.35@ .60
SOUTH AND SOUTHWEST					
Big Seam lump	Birmingham	$2.15	$2.15	$2.15	$2.15
Big Seam mine-run	Birmingham	1.40@1.50	1.40@1.50	1.40@1.50	1.40@1.50
Harlan (Ky.) block	Chicago	1.75@2.00	1.75@2.50	1.75@2.50	1.75@2.50
Harlan (Ky.) egg	Chicago	1.50@1.75	1.50@1.75	1.50@1.75	1.50@1.75
Harlan (Ky.) slack	Chicago	.60@ .85	.60@ .90	.60@ .90	.60@ .90
Harlan (Ky.) block	Louisville	1.50@2.00	1.50@2.00	1.50@2.00	1.40@2.00
Harlan (Ky.) egg	Louisville	1.25@1.65	1.25@1.65	1.25@1.65	1.20@1.75
Harlan (Ky.) mine-run	Louisville	1.30@1.50	1.30@1.50	1.30@1.50	1.30@1.50
Harlan (Ky.) nut-and-slack	Louisville	.60@ .90	.60@ .90	.50@ .75	.50@ .85
Harlan (Ky.) block	Cincinnati	1.35@2.75	1.35@2.75	1.35@2.75	1.35@2.75
Harlan (Ky.) egg	Cincinnati	1.10@2.00	1.10@2.00	1.15@2.00	1.15@2.00
Harlan (Ky.) mine-run	Cincinnati	1.00@1.60	1.00@1.60	1.00@1.60	1.00@1.60
Harlan (Ky.) nut-and-slack	Cincinnati	.35@ .60	.35@ .60	.35@ .60	.35@ .60
Hazard (Ky.) block	Chicago	1.75@2.00	1.75@2.50	1.75@2.50	1.75@2.50
Hazard (Ky.) egg	Chicago	1.25@1.50	1.25@1.50	1.25@1.50	1.25@1.50
Hazard (Ky.) slack	Chicago	.60@ .70	.60@ .70	.60@ .70	.60@ .70
Hazard (Ky.) block	Louisville	1.25@1.75	1.25@1.75	1.25@1.75	1.25@1.75
Hazard (Ky.) egg	Louisville	1.00@1.30	1.00@1.30	1.00@1.30	1.00@1.30
Hazard (Ky.) mine-run	Louisville	1.00@1.25	1.00@1.30	1.00@1.30	1.00@1.30
Hazard (Ky.) nut-and-slack	Louisville	.40@ .75	.50@ .75	.40@ .75	.40@ .75
Hazard (Ky.) block	Cincinnati	1.25@1.50	1.25@1.50	1.25@1.50	1.25@1.50
Hazard (Ky.) egg	Cincinnati	1.00@1.35	1.00@1.40	1.00@1.40	1.00@1.40
Hazard (Ky.) mine-run	Cincinnati	.90@1.25	1.00@1.25	1.00@1.25	1.00@1.25
Hazard (Ky.) nut-and-slack	Cincinnati	.35@ .50	.35@ .50	.35@ .50	.35@ .50
Elkhorn (Ky.) block	Chicago	1.75@2.25	1.75@2.25	1.75@2.25	1.75@2.25
Elkhorn (Ky.) egg	Chicago	1.50@1.75	1.50@1.75	1.50@1.75	1.50@1.75
Elkhorn (Ky.) slack	Chicago	.75@1.25	.75@1.25	.75@1.25	.75@1.25
Elkhorn (Ky.) block	Louisville	1.25@1.50	1.40@2.00	1.40@2.00	1.40@2.00
Elkhorn (Ky.) egg	Louisville	1.00@1.40	1.00@1.40	1.00@1.40	1.00@1.40
Elkhorn (Ky.) mine-run	Louisville	1.00@1.25	1.00@1.25	1.00@1.25	1.00@1.25
Elkhorn (Ky.) nut-and-slack	Louisville	.60@ .75	.60@ .90	.50@ .75	.50@ .75
Elkhorn (Ky.) block	Cincinnati	1.35@2.75	1.35@2.75	1.35@2.75	1.35@2.75
Elkhorn (Ky.) egg	Cincinnati	1.00@2.00	1.00@2.00	1.00@2.00	1.00@2.00
Elkhorn (Ky.) mine-run	Cincinnati	1.00@1.65	1.00@1.60	1.00@1.60	1.00@1.60
Elkhorn (Ky.) nut-and-slack	Cincinnati	.35@ .60	.35@ .60	.35@ .60	.35@ .60
Kansas shaft lump	Kansas City	3.00@3.25	3.00@3.25	3.00@3.25	3.00@3.25
Kansas strip lump	Kansas City	2.00@2.25	2.00@2.25	2.25	2.25
Kansas mine-run	Kansas City	1.75@2.00	1.75@2.00	1.75@2.00	1.75@2.00
Kansas screenings	Kansas City	.75@1.25	.75@1.25	1.00@1.25	1.00@1.25

WHAT'S NEW

IN COAL-MINING EQUIPMENT

Welding Accessories

Linde Air Products Co., New York City, has added the No. 11 welding torch and the No. 21 cutting attachment to its line of "Purox" medium-pressure equipment for oxyacetylene welding and cutting. The No. 11 torch supersedes the No. 10, and is adaptable to a wide range of welding from the lightest sheet metal up to ½-in. plates. Light weight, perfect balance, and adjustable head angle are stressed by the company. Tips Nos. 2, 4, 6, 8, and 10 are furnished as standard equipment. The No. 21 cutting attachment is designed for use with the No. 11 torch, and, according to the company, will cut metal up to 2 in. in thickness. Weight of the attachment is 1 lb. 8 oz. It is furnished with one- and two-piece "Purox" cutting tips.

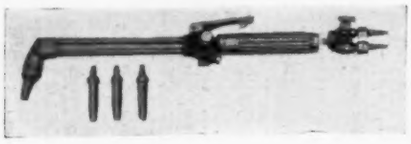


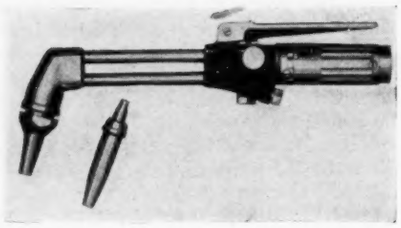
"Purox" No. 11 Welding Torch

The Linde company also has added a cutting blowpipe and cutting attachment to its new line of "Prest-O-Weld" medium pressure apparatus of the detachable valve body design. Both attachments, together with the Types W-105 and W-106 welding blowpipes, can be used interchangeably with the same valve body. The new Type C-105 cutting blowpipe is said to be light and well-balanced, yet strong enough to bear the brunt of hard usage. It is furnished with four cutting nozzles and a 75-deg. angle head. Steel and wrought iron up to 12 in. may easily be cut with the blowpipe, the company says. The Type CW-105 cutting attachment is of the single-joint design, and is attached directly to the valve body. Its length is 11 in., and it is furnished with nozzles Nos. 1 and 2 of the Type C-105 blowpipe.

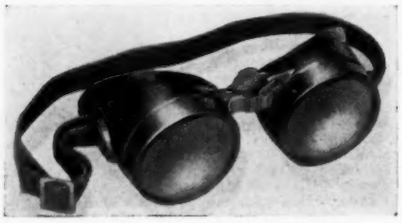
"Purox" No. 21 Cutting Attachment

"Prest-O-Weld" Type C-105 Cutting Blowpipe





"Prest-O-Weld" Type CW-105 Cutting Attachment



"Oxweld" No. 12 Welding Goggles

"Oxweld" No. 12 welding goggles, made of the molded, heat-, light-, and electrically resistant plastic, "Oxweldite," have been introduced by the Linde company. They are designed to fit the eyes and conform to the individual nose. Ventilation without sparks is provided, and the field of vision has been increased by the use of 50-mm. diameter lenses, instead of the usual 47-mm. type. Brown-colored "B" lenses are available, as with the older types. In addition, a new green "A" lens can be secured in three shades. Lenses are easily removed and replaced, it is said.

Self-Protected Ball Bearing

Norma-Hoffman Bearings Corporation, Stamford, Conn., has introduced the new "7000" series of felt-protected, closed-type ball bearings in a full range of sizes, interchangeable in over-all dimensions with all other makes of self-protected bearings. Simplicity in mounting and lubricating and a reduction in the cost of machining and mounting are emphasized by the company. Wide solid inner and outer rings give maximum contact on the shaft and in the housing, it is claimed, and the design of the bearings in the series is such that they can be clamped on both sides. The bearings will carry substantial thrust loads in each direction in combination with a radial load, according to the company. The "Grease-seal" feature is said to provide ample space for lubricant and to effectually prevent its escape.

New Battery Developed

To meet the increasing demand for large-capacity cells, the Edison Storage Battery Co., Orange, N. J., has added to its line the new "C" series, manufactured in five different capacities ranging from 337.5 to 675 amp. hr. The cells, it is asserted, vary from the "A" type only in that the positive and negative plates are 50 per cent higher. They occupy the same floor space as "A" cells containing the same number of positive plates. In addition to the higher ampere-hour capacity, the new cells, it is claimed, have a watt-hour capacity 50 per cent higher than the "A" cells, thus giving a 50 per cent increase in working capacity of the vehicle without impairing its flexibility of travel in narrow aisles, small elevators, restricted mine entries, and shafts.

Car Pulling Unit

Webster & Weller Mfg. Cos., Chicago, now offer the new Weller capstan car puller, which is said to be economical, compact, and easily operated. The unit is built in three sizes to handle cars with a weight of 1 to 80 tons. It is electrically operated, self-contained, and weatherproof, and is designed to pull cars or trucks from any angle.

Weller Capstan Car Puller

What's NEW *in Coal-Mining Equipment*

Drill Sharpening Machine

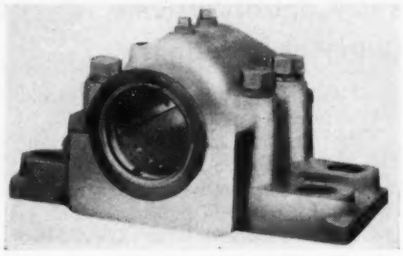
Sullivan Machinery Co., Chicago, has brought out the new Class "E" drill sharpener, which it declares is designed to bring to users with only a small amount of work the advantages of mechanical sharpening and shanking of rock-drill and hammer-drill steel. The new sharpener, it is stated, makes cross or rose (six-point) bits up to 2½ in. maximum gage on ⅞- or 1-in. steel. It also forges collar shanks, and dies are available for any steel section. Furthermore, it can be used to sharpen concrete breaker pick or chisel bits on hexagonal steel as large as 1⅛ in.

Sullivan Class "E" Drill Sharpener

The new drill is said to handle the above work with all the efficiency of larger sharpeners, yet the total weight is only 350 lb. Floor space required is a square 18 in. on a side, and the height is slightly more than 4 ft. It can be operated satisfactorily with no other provision than bolting it to the floor or light timbers, the company says. Portability of the sharpener enables the user to keep it up with the work and close to the portable compressor. Upsetting and vertical hammers are operated by compressed air. The steel is held in a clamp for upsetting by a foot lever and toggle, which provides a sure and positive grip and permits rapid action on the steel. The sharpener, the company asserts, is very economical of air, and its operation can easily be mastered by a blacksmith or mechanic.

Bearing for Heavy Duty

Almost ideal lubrication is provided in the new Robins-Jones bearing for heavy-duty service, according to the Robins Conveying Belt Co., New York City, owner of the sales rights. While the equipment is neither a ball nor roller bearing, the company claims that it is in every sense of the word an anti-friction bearing, with a coefficient of friction almost as low as that of either the ball or roller types.



Robins-Jones Bearing

The design of the bearing provides for an ample oil reservoir in the base, from which oil is drawn up through a series of ducts in the bearing metal by the rotation of the shaft. The oil comes in contact with the bearing surface at the point of greatest pressure, and is carried uniformly to the entire surface of the shaft. At the joint between the base and the cap, slots catch the oil and return it to the reservoir through scavenger holes. According to the maker, the shaft may be rotated in either direction with equally good lubrication, and the bearing may be applied to both vertical and horizontal shafts.

Load or pressure can be taken from either direction, as the cap is equipped with the same reservoir and ducts as the base. Grooves near the ends of the bearing prevent leakage and lead the oil that works out back to the reservoir. As the bearing is split, the lower liner can be rotated around the shaft, making it unnecessary to lift it out of the bearing. The base is flat underneath, providing better distribution of the weight. The removable base liners rest in finished saddles designed to resist forces in the holding-down bolts when the supporting surface is not true.

Portable Loader Developed

Link-Belt Co., Philadelphia, Pa., has brought out a new and improved portable loader, retaining the name "Cub," which was applied to its predecessor. The new "Cub," the company says, is 100 lb. lighter than the old, and has the following added features: 18-in. "Service" brand conveyor belt; all-metal troughing roll idlers with roller bearings; bronze bushings in all shaft bearings; 9-in. head pulley that pulls without slipping; ball-bearing electric motor, well protected; cut gears, short chain drive; Alemite lubrication; convenient crank-operating self-locking worm and wheel for changing height; sharp-pointed nose at the foot and improved boot with belt guide to keep belt aligned; substantial, large-area screening chute can be furnished where required; hinged trough plates can be obtained if required; return run of belt covered throughout its length; substantial channel frame; roller-bearing wheels for easy moving.

Lighting Control

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has developed a new photo-electric lighting control relay which operates to turn on electric lights when the intensity of daylight decreases to a certain point. Conversely, the relay will switch off the lights when natural light increases to a certain predetermined intensity. The operation of the lighting control relay is effected by variations in the intensity of light falling on a photo-electric tube.

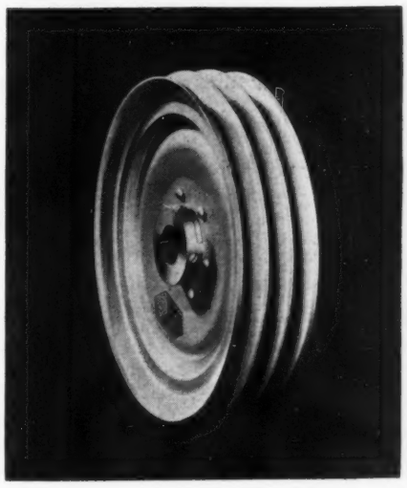
Cutting Torch Uses Gasoline

Use of gasoline instead of acetylene features a new line of metal-cutting equipment developed by the Torchweld Equipment Co., Chicago. Instead of the usual acetylene tank placed alongside the oxygen cylinder, a 2-gal. gasoline can is mounted at the rear of the oxygen tank. According to the company, this construction results in a saving in weight, decreases the size of the truck, and facilitates movement. The unit consists of a cutting torch with four gasoline cutting tips; 25 ft. of high-pressure oxygen hose; 25 ft. of flexible, metallic, gasoline hose; gasoline tank; high-pressure regulator; and other auxiliaries.

Light-Weight Steel Sheaves

To meet the demand for a light-weight, low-priced drive, the Allis-Chalmers Mfg. Co., Milwaukee, Wis., has developed the "Texsteel" sheave, and announces that complete "Texsteel-Texrope" drives are available for immediate delivery. According to the company, "Texsteel" sheaves are die-pressed from extremely tough steel, after which each section is welded both at the web and rim to eliminate vibration and noise and to give an accurate balance for true running. They are made in a wide range of diameters, and permit operating ratios of as high as 6 to 1.

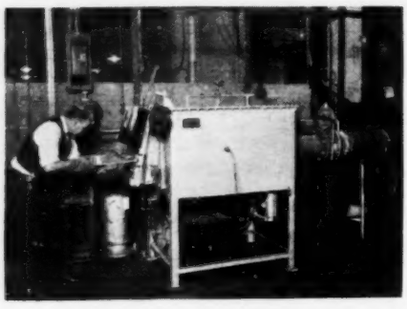
"Texsteel" Sheave



Power Applications and Control Systems Covered in New Equipment Offerings

GENERAL ELECTRIC CO., Schenectady, N. Y., offers a furnace for processes which must be carried out in a reducing atmosphere at temperatures up to 2,600 deg. F. The heating element consists of molybdenum wire, and it operates in a hydrogen atmosphere which prevents oxidizing of either the wire or the charge.

Details pointed out by the manufacturer are: 10-kw. rating, single-phase, 220 volts; length of heating chamber,

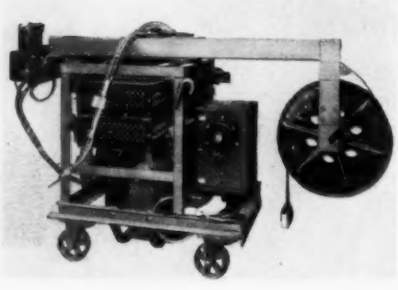


High-Temperature Furnace

2½ ft.; width, 6 in.; height, 4 in.; overall length, 6 ft.; width, 2 ft. 10 in.; height, 5 ft. 4 in.; heating elements are easily replaced in case of burnouts; gas consumption is low, about 30 cu.ft. per hour; radiation loss is low, about 6 kw. per hour at 2,200 deg. F.; good heat distribution throughout the furnace; and automatic temperature control.

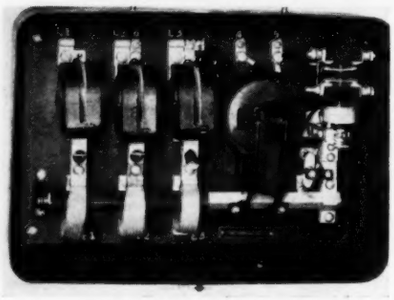
For atomic-hydrogen welding, the General Electric Co. has brought out a new automatic welder, said to be the first application of automatic control to this welding process. The new welder, according to the company, is designed for longitudinal seam welding of all kinds. It consists of a clamping mechanism for holding the work, a welding head and control equipment, an automatic travel carriage, and other accessories. Clamping mechanism and travel carriage are of the standard type, while the welding head and control, it is said, are of special design to suit the use of atomic-hydrogen welding. In addition, there is an auxiliary device for feeding filler rod into the arc, as the tungsten electrodes are consumed slowly and do not contribute metal to the weld.

Automatic Atomic-Hydrogen Welder



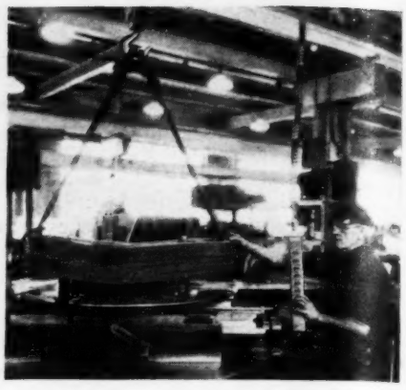
The General Electric Co. announces the CR-7006-T-5, oil-immersed, magnetic switches for heavy-current duty in controlling large motors. The new switches supersede the CR-7006-T-3, 150-amp., magnetic switch, and consist of a three-pole, 200-amp., oil-immersed contactor; a temperature overload relay; two current transformers; and an undervoltage relay, all mounted on a floor-type framework, built with a steel front. Instantaneous undervoltage protection is obtained, the company says, with one form when used with a drum switch. Time undervoltage protection is obtained with the other form when employed with a momentary-contact-type, pushbutton control. For standard motors, the switches are rated at 750 hp. at 2,500 volts and 1,200 hp. at 4,000 volts. Approximate weight is 525 lb., and each requires 5½ gal. of oil. These switches, the makers state, may be used on 6,600-volt motors, with a maximum of 750 hp. by providing 6,600-volt current transformers.

For use in either alternating- or direct-current circuits, the General Electric Co. offers the CR-2811 magnetic switch, which is provided with a latch to hold the contactor in closed position. Such a condition is particularly desirable, the company says, where the hum of a standard magnetic switch must be eliminated, where the power to hold the contactor closed by the usual method is costly, and where the switch must not open in case of power failure, coil failure, or short circuit. The equipment consists of two- or three-pole, alternating-current contactor with latching mechanism, mounted on a base, with or without inclosing case. The contactor is standard, except for an extension of the shaft, to which the latching mechanism is attached.



CR-2811 Magnetic Switch

The switch, it is asserted, is positive in action. It is impossible, the company says, to latch the contactor except in the fully closed position. Construction of the latch and the spring pressure against it provide against release as a result of vibration, it is said. Main contacts are silver-faced.



Pushbutton Control for Floor-Operated Crane

A new pendant-type pushbutton for controlling floor-operated cranes has been developed by the General Electric Co. It is designed to supersede the present rope and chain types of control. Advantages stressed by the company are: greater safety for the crane operative, elimination of time losses, and reduction in aisle space required.

The "Novalux" handy floodlight, a 100-watt, general utility floodlight projector has been announced by the General Electric Co. for use where light requirements do not call for the larger, standard floodlighting units. The projector, according to the company, weighs less than 3 lb. and measures 10 in. deep, 13 in. high with supporting stand, and is built for a 100-watt, inside-frosted, general-service incandescent lamp with a 4⅜-in. light center and medium screw base. Front lens is 8 in. in diameter.

Another addition to the General Electric line is the open-type floodlight, designed for applications where an inexpensive but highly efficient unit is required. The equipment is designed to use either one or two lamps, ranging from 750 to 2,000 watts. Reflectors are 30 in. in diameter, and various types of mountings may be obtained. Both horizontal and vertical adjustments are provided.

100-Watt Utility Floodlight Projector